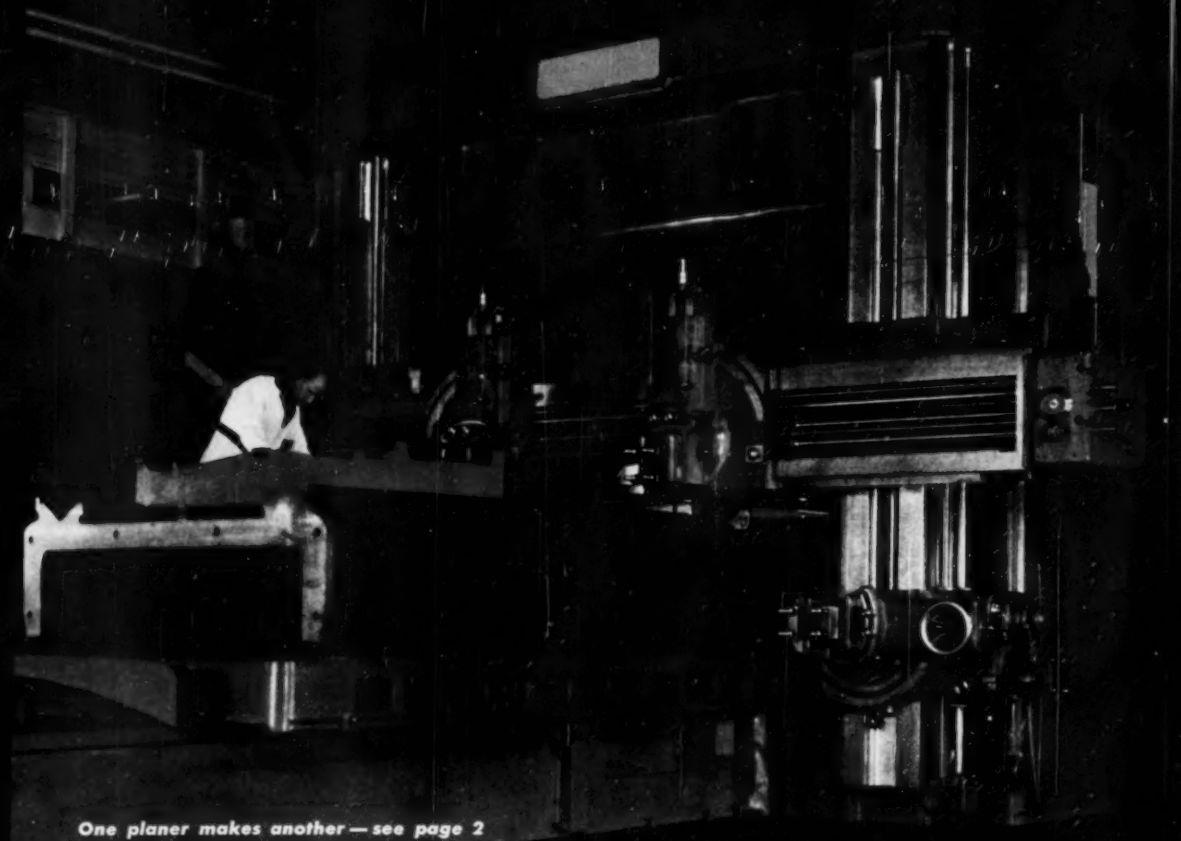
# American Machinist

APRIL 21, 1949

McGRAW-HILL MAGAZINE OF METALWORKING PRODUCTION



*One planer makes another — see page 2*

**KEEP SUGGESTIONS COMING**

**ODD JOBS WITH INDUCTION HEAT**

**JOINT AUTOMOTIVE PRESS-ROOM STANDARDS**

New Heald Centerless Internal

# LOADS AND UNLOADS IN ONE SECOND !

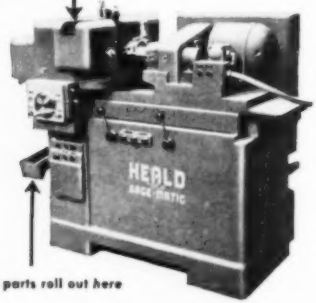
## ...new development speeds up your centerless grinding cycle

If you are grinding work that can be rotated on its own outside diameter, you are probably already familiar with the centerless principle of internal grinding—an exclusive Heald development. Today, on the Heald Model 181 Centerless, this principle has been further refined by a new method of still faster loading and unloading.

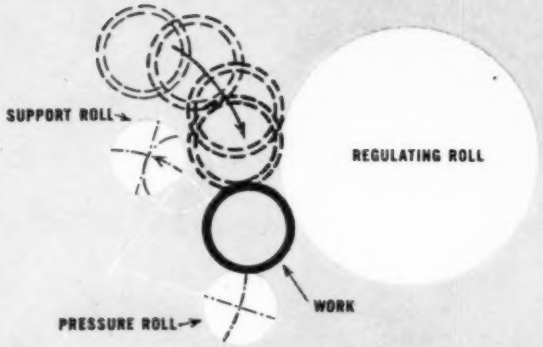
The diagrams at the right show how the work is fed into grinding position, and automatically unloaded by gravity. The entire loading and unloading operation has been reduced to one second! This means that the 181 spends less time grinding air. It also means that the entire grinding cycle may be shortened by as much as 15%.

This new development is typical of the production-minded engineering back of every time-saving, effort-saving feature of the new Heald machines. Your nearest Heald representative will be glad to study your precision finishing problems and recommend the right machine for the job.

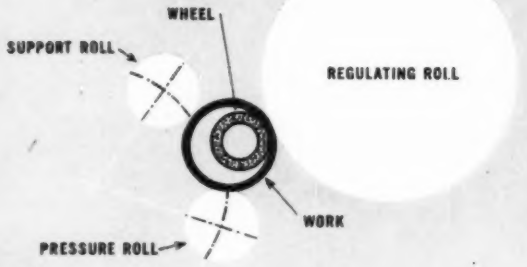
Completely automatic—work enters here



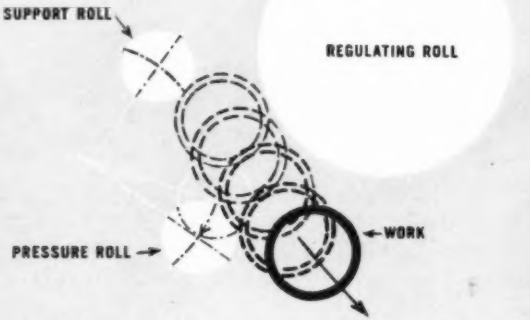

Finished parts roll out here




**LOADING.** At the start of each cycle, the upper support roll shifts to the left, allowing the part to drop into place between the pressure roll and the regulating roll.




**GRINDING.** The support roll then moves back to the right, into the grinding position, accurately locating the part, which is rotated on its own O.D. between the three centerless rolls.




**UNLOADING.** As soon as the grinding operation is completed, the pressure roll shifts to the left, allowing the work to drop down into the unloading chute. The pressure roll instantly moves back into position and the cycle is repeated.

HEALD

**PRECISION** INTERNAL AND SURFACE GRINDERS

**PRECISION** BORE-MATIC FINISHING MACHINES

**THE HEALD MACHINE COMPANY**
**Worcester 6, Mass.**

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# American Machinist

MAGAZINE OF METALWORKING PRODUCTION


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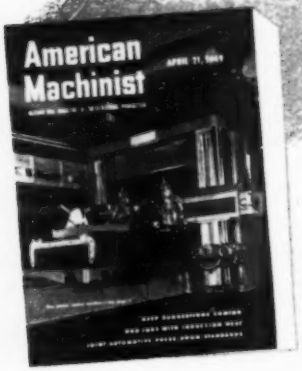



# Chips and QUIPS

***Our Cover*** . . . A 120-in. x 84-in. x 18-ft. Gray heavy-duty double-housing planer is busily reproducing itself on our front cover, for on its table is the front bed section of a 120-in. x 84-in. by 16-ft. planer, one of a lot being built for an automotive plant. The section has been rough- and finish-planed, and the operator is checking the all-important "fit" of the ways or main guide bearings. These ways are the heart of a planer—ultimate accuracy of the machine depends upon them. The large orange object is a master gage for checking the bed and mating tableways. As an idea of the accuracy of the machine pictured, T-slots of the table do not vary from a theoretical straight line at any point by more than 0.0005 in. The Kodachrome was taken by Marsh.

***Standards*** . . . In these cost-conscious days, there is more incentive than ever to avoid expensive frills. Therefore, it is with genuine pleasure that we provide a Special Report on the new Joint Automotive Industry Standards for Pressroom Equipment, which Associate Editor Le Grand has been digging at for many a moon. They will simplify the problem of transferring dies and bolster plates from one press to another.

***Odd Jobs*** . . . Every so often, Frank Curtis remembers that 20 years ago he was an *A.M.* editor and puts together the newest on induction heating for us. The sketch-and-captain story in this issue is the latest. It pictures a number of odd jobs done with induction . . . Also, Chester Ricker shows a new trick at Olds—keeping several small castings in one piece until most operations are completed. Saves much handling time.

***Twist*** . . . General mags and detective-story pulps implore their authors to give their yarns a twist (See "Dear Boss," page 154). Being factual-minded, we shy away from such antics. But in this issue we present a 1-pager with a twist—a different way in which to convince your men they should take care of their tools. A little oil goes a long way—on a machine tool as well as in politics.

***More Medicine*** . . . Micro Switch Division has been using its own product on its dies, with salutary results. How three Micro switches handle a complex progressive die—with stock coming in from two directions—is described in this issue.

***Good Brew*** . . . Like a good brew, some of our articles are a long time in the fermenting and making. We recently had one on induction heating that was in process by the authors for four years; so were our two Special Reports on Surface Finish. A year is common—but the all-time high is a Practical Idea which the contributor was working on 30 years ago. He showed it to Fred Colvin at the time. He finally worked out the idea, and describes it proudly in a forthcoming issue.

***Balanced Wave*** . . . Now that television is rounding the corner, somebody has at last remembered the poor radio user and his troubles with static. G. E. has announced that all future inert-arc welders will have built-in "balanced wave" to take out the high-frequency signal—also make the weld easier to control and save 25% of the argon gas.

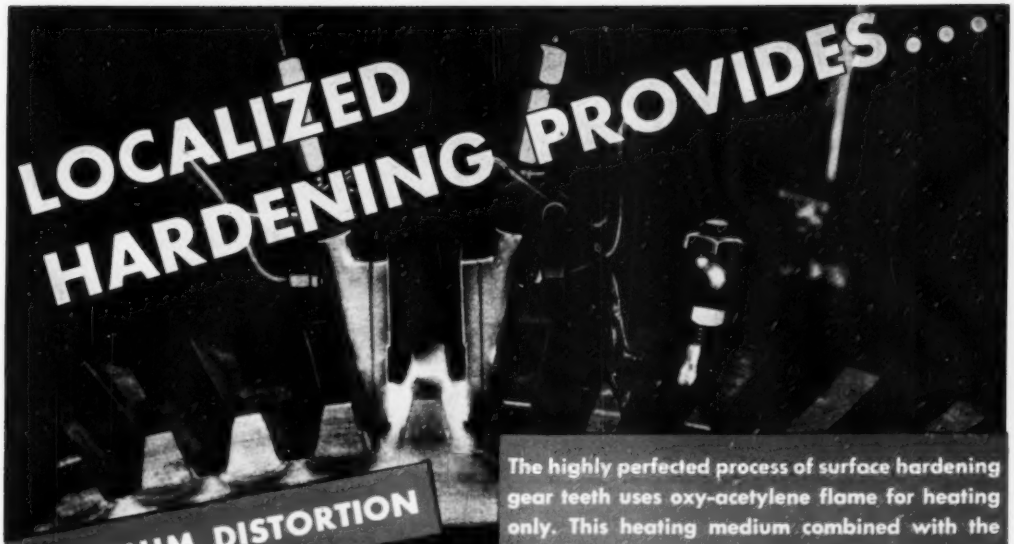
***Control*** . . . Coordinating all carbide-tool operations under one head, at Cleveland Automatic Machine Co., gave maximum results from carbides in this job-lot setup. The story is in this issue, after three years of experiments. Many tools are standardized, cost studies are run on each operation. Cost estimates are easier, since maintenance and control are vested in one department.

***Coming*** . . . May 5 *A.M.* will have a Special Report on How to Choose and Use Files—familiar and frequently abused hand tool. There are also some hints for training foremen, a story on finishing machines, a study of solder efficiency, something on workplace layout, on plastic cams for screw machines, on tricky operations in making scroll chucks, on fillets in keyways, on furnace brazing, and so on. Many short articles, each full of ideas.

**Good Suggestion** . . . Ed Schmid, *Jr.*, was born in Schuyler, Neb., 33 years ago. He went through the public schools at Lincoln and was graduated with a B. Sc. in E.E. from the U. of Neb. in 1938. After a post-grad year, he reversed Horace Greeley's precept and headed East to Armco Steel, where he became an advertising copywriter. He soon moved to Personnel & Public Relations as managing editor of the company magazine. Then came World War II, and five long years in the infantry, finally as a Major.

Mr. Schmid's description of the Armco suggestion system appears in this issue. He's also free-lanced a number of pieces (primarily mystorian, with some humor and sports articles) to *Judge*, *Sports Afield*, *Liberty*, *Dog World*, *Pathfinder*, *Reader's Digest*, and detective pulps. He's seeking patents on three fishing lures, a bottle holder and a new container, and has painted dog pictures which sold in Western art shops and stores.

# LOCALIZED HARDENING PROVIDES . . .



**MINIMUM DISTORTION**

**MAXIMUM WEAR RESISTANCE**

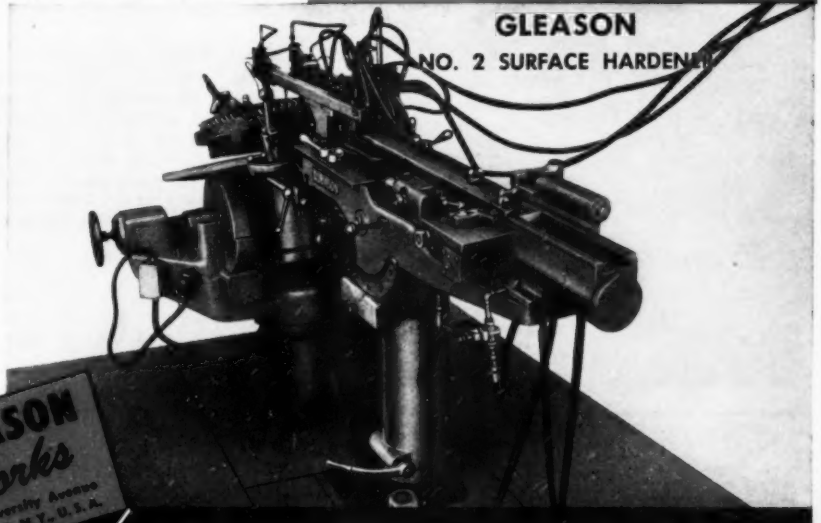
**UNIFORM HARDNESS**

***. . . at Low Cost***

One machine with a choice of replaceable burner tips can handle a whole range of sizes and pitches of bevel, spur and internal gears.

The highly perfected process of surface hardening gear teeth uses oxy-acetylene flame for heating only. This heating medium combined with the accurate mechanical features embodied in the Gleason surface hardeners make possible surface hardening of gear teeth with absolute uniformity, including a mechanical speed-up to avoid overheating the ends of the tooth and reversal of the burner slide to pre-heat the next tooth to be hardened. Each tooth of a gear is hardened for the same length of time, to the same depth, and each gear of a production run maintains the same uniformity for quiet, smooth, durable operation.

Write for literature "Surface Hardening of Gear Teeth" for further information.



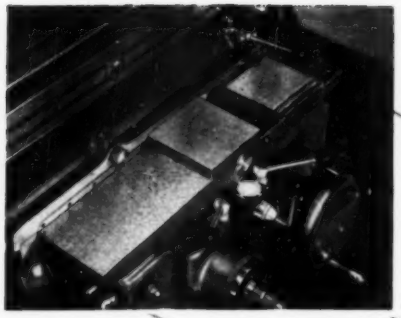
**GLEASON**

**NO. 2 SURFACE HARDENER**

**GLEASON Works**
1000 University Avenue
Rochester 3, N. Y., U. S. A.

*Builders of Bevel Gear Machinery for Over Eighty Years*

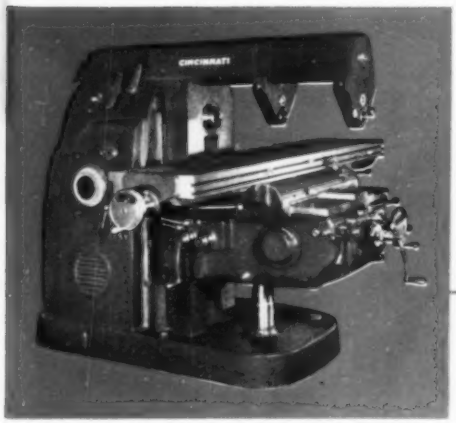
# . . . and a yard wide




Big rough castings with a lot of finishing stock are no worry to the operators of CINCINNATI Dual Power Dial Type Milling Machines. These heavy duty millers have what it takes for a rapid rate of metal removal up to 50 hp. Nos. 5 and 6 sizes have knees a yard wide (illustration above) . . . ample support for the saddle, table and work.

Dynapoise overarm offers a plus factor which is available only on CINCINNATI. It adds a stabilizing influence by damping out self-excited chatter before it can occur.

And look at the wide, square gibbed grip the knee has on the column. It easily resists the stresses developed when taking heavy cuts with large cutters.




Rugged construction and ability to mill a big volume of chips is not the only advantage offered by CINCINNATI Dual Powers. Operators like them because they're easy to run. A single lever, front or rear, *changes speeds and feeds by power.* Other features are outlined in attractive literature. May we send a copy to you? Complete specifications may be obtained by writing for catalog M-1647 for the Dual Power Dial Types, and catalog M-1644 for the High Power Machines.

CINCINNATI High Power and Dual Power Dial Type Milling Machines are built in Nos. 3, 4, 5 and 6 sizes; Plain (illustrated at left) and Vertical styles. Also Universal style for Nos. 3 and 4.

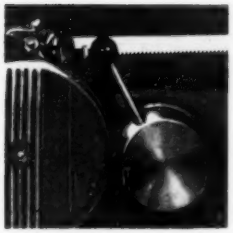
## THE CINCINNATI MILLING MACHINE CO.

CINCINNATI 9, OHIO, U. S. A.

MILLING MACHINES • BROACHING MACHINES • CUTTER SHARPENING MACHINES
FLAME HARDENING MACHINES • OPTICAL PROJECTION PROFILE GRINDERS • CUTTING FLUID

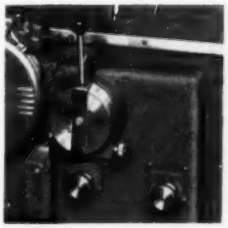
*Right:* Spindle Reciprocating Attachment. Reciprocation of grinding wheel spindle is automatic, with standard stroke from 1/32" to 3/16". This is an unusually desirable feature for infeed grinding operations.

*Below:* A typical infeed job. Grinding a short section of a rotor shaft on a CINCINNATI FILMATIC 6" Plain Hydraulic Grinding Machine. The operator has his right hand on the infeed lever.



*Above:* Hand Servo Infeed Attachment—hydraulically operated. For manual control of plunge cut (infeed) grinding. Includes rapid advance of wheel to work, and automatic starting and stopping of coolant flow and work rotation. Total wheelhead movement equals 1", about .990" of which is rapid traverse.

*Above:* Illustrating the use of the Hand Servo Infeed Attachment. This equipment is recommended for comparatively small quantities of infeed work.



*Right:* Automatic Infeed Attachment—hydraulically operated. Complete cycle is automatic . . . rapid advance wheel to work, grind, tarry and return.

*Left:* With the Automatic Infeed Attachment, the operator simply moves the lever a slight amount, then the entire cycle proceeds automatically. While grinding continues, operator may prepare next work piece. This feature is especially desirable for infeed grinding of large quantities.

CINCINNATI FILMATIC No. 10"-L Plain Hydraulic Grinding Machine.

## You can Assign Production Infeed Grinding TO CINCINNATI FILMATIC PLAIN HYDRAULICS

Productivity of the machine and quality of infeed work both perk up when you equip a CINCINNATI FILMATIC Plain Hydraulic Grinder with a grinding wheel spindle Reciprocating Attachment and a Hand Servo, or Automatic Infeed Attachment. ¶ These features, available at slight extra cost, add production infeed to the traverse grinding operations which you may assign to your CINCINNATI FILMATIC Plain Hydraulics. Catalog No. G-566 contains engineering specifications on the 6" and 10"-L machines; catalog No. G-572 for the 10" and 14"-L grinder. Write for copies.

CINCINNATI GRINDERS INCORPORATED

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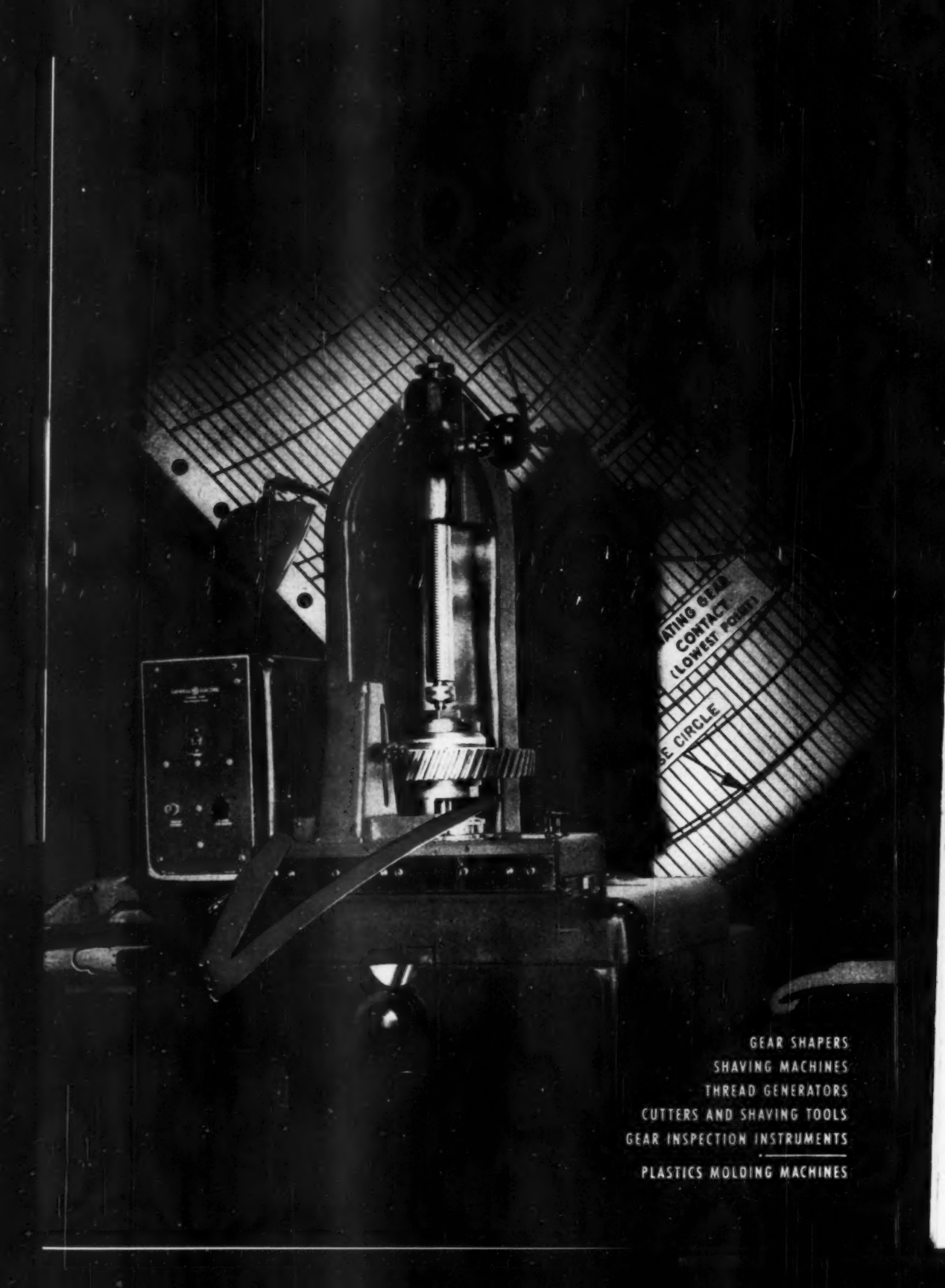
CINCINNATI

CENTER TYPE GRINDING MACHINES • CENTERLESS LAPPING MACHINES • CENTERLESS GRINDING MACHINES




GEAR SHAPERS
SHAVING MACHINES
THREAD GENERATORS
CUTTERS AND SHAVING TOOLS
GEAR INSPECTION INSTRUMENTS

PLASTICS MOLDING MACHINES

# GEAR INSPECTION that accepts broad-shouldered responsibility

Recorded charts of each gear inspection operation, automatically produced by these Inspection Instruments, are the fundamental safeguard. The vagaries of the human element are minimized to the "Nth" degree. The charts are permanent and can be filed for future reference.

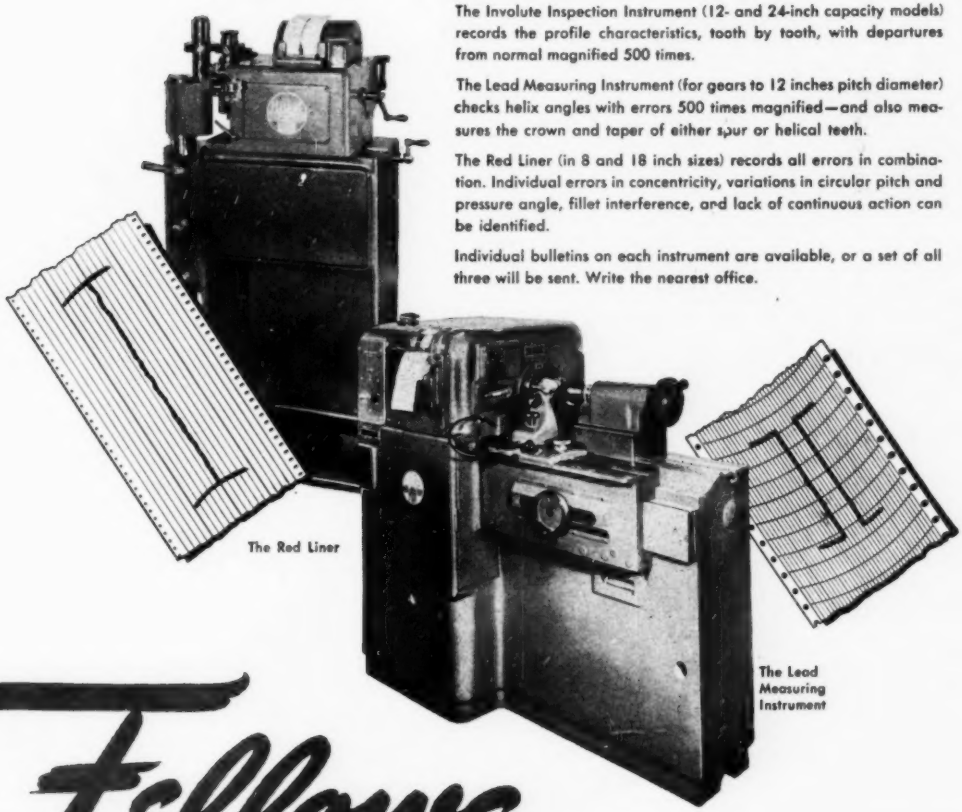
The operating accuracy of each of the Instruments is a known quantity; checked and rechecked at any time by reference to a master gauge or gear, which is part of the regular equipment. While the inspection of external gears is pictured here, standard equipment provides for checking internal gears as well.

The Involute Inspection Instrument (12- and 24-inch capacity models) records the profile characteristics, tooth by tooth, with departures from normal magnified 500 times.

The Lead Measuring Instrument (for gears to 12 inches pitch diameter) checks helix angles with errors 500 times magnified—and also measures the crown and taper of either spur or helical teeth.

The Red Liner (in 8 and 18 inch sizes) records all errors in combination. Individual errors in concentricity, variations in circular pitch and pressure angle, fillet interference, and lack of continuous action can be identified.

Individual bulletins on each instrument are available, or a set of all three will be sent. Write the nearest office.



The Red Liner

The Lead Measuring Instrument

*Fellows*

THE FELLOWS GEAR SHAPER COMPANY • Head Office and Export Department • 78 River Street, Springfield, Vermont.
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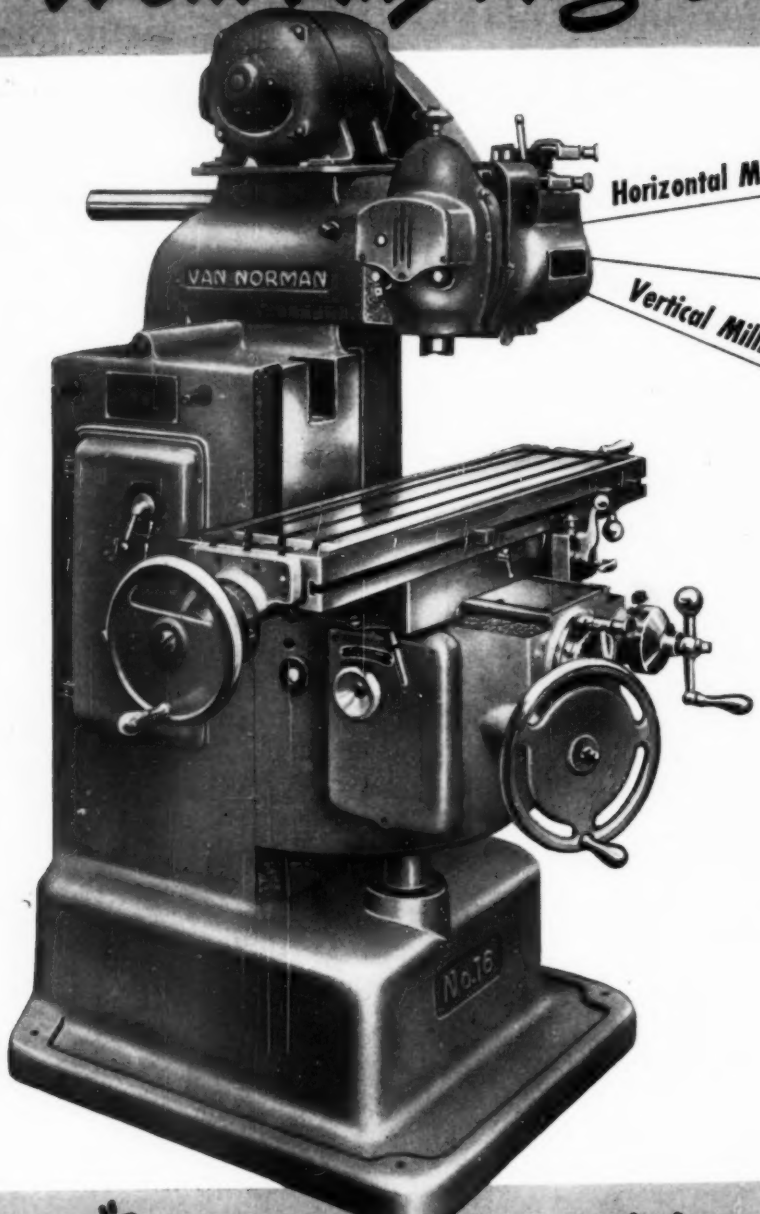
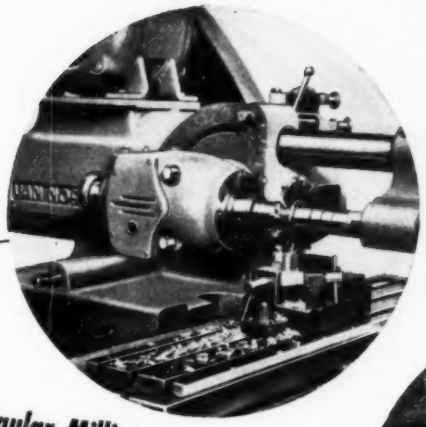
# From Any Angle . . .



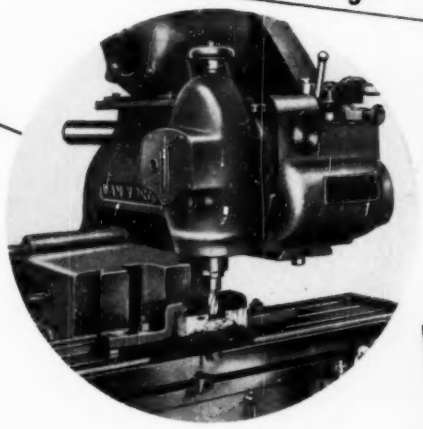

Horizontal Milling

Vertical Milling

"It pays to Van Normanize"



Angular Milling



# VAN NORMAN

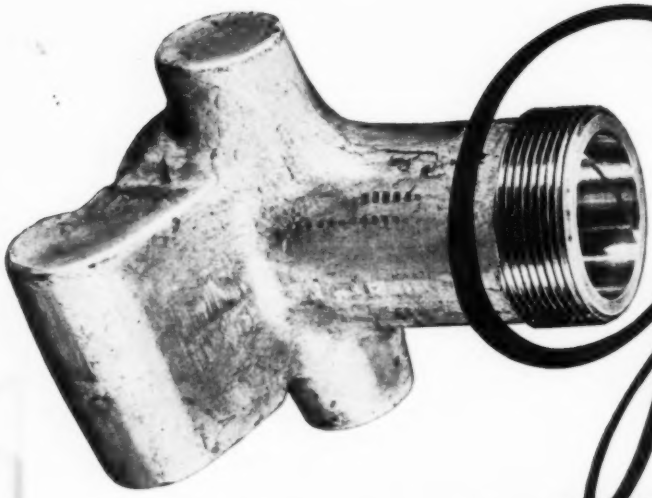
## NO. 16 RAM TYPE MILLING MACHINES INCREASE PRODUCTIVITY

This Van Norman No. 16 Miller gives you many outstanding and exclusive advantages that assure more workability for your plant.

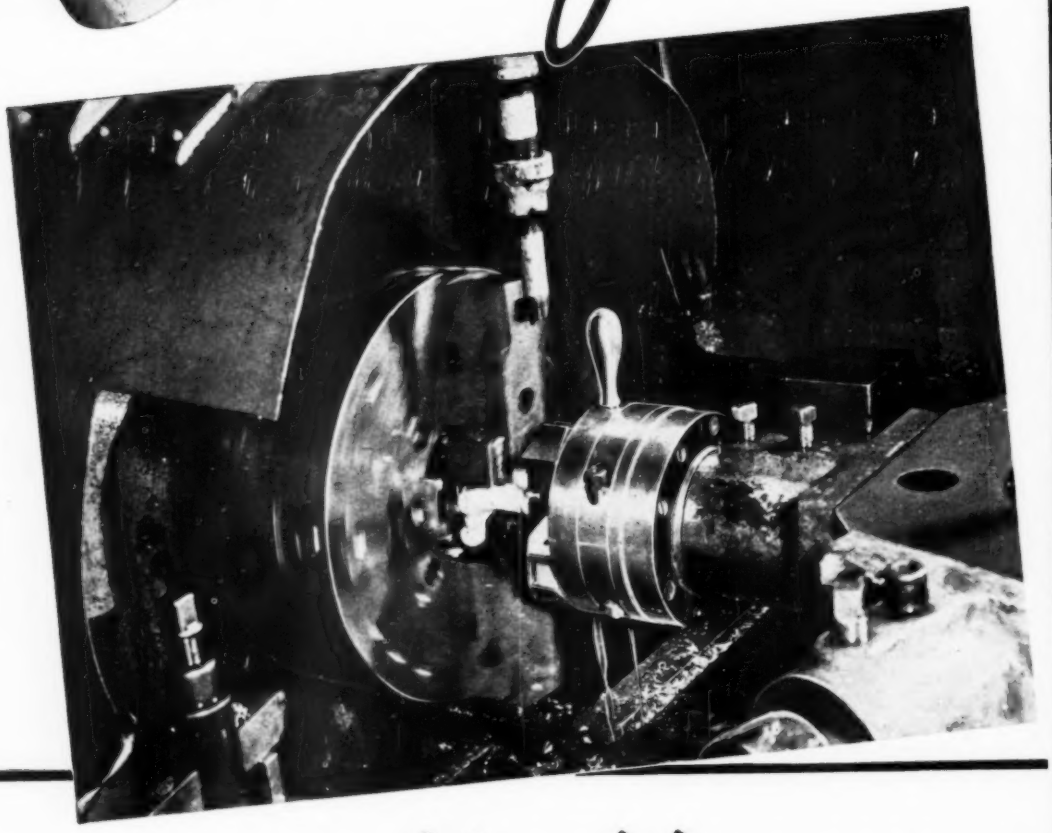
The adjustable cutterhead, which permits vertical, horizontal or angular milling on one machine, cuts idle machine time by as much as 50%. The moveable ram plus the saddle cross feed increases the work range and capacity of the miller . . . enables you to handle larger work pieces with ease. Single lever built-in electrical control simplifies operation. Spindle speeds from 95 to 2,000 rpm give you the right speed for every type of cut. Add such construction features as hardened alloy steel gears, large hardened alloy steel multi-splined shafts, precision-ground feed screws, one-shot metered lubrication and you have a milling machine that provides greatest productivity, lowest cost milling and long operating life.

***Write for bulletin, today***

**VAN NORMAN COMPANY**
**Springfield 7, Massachusetts**



# Good WITH



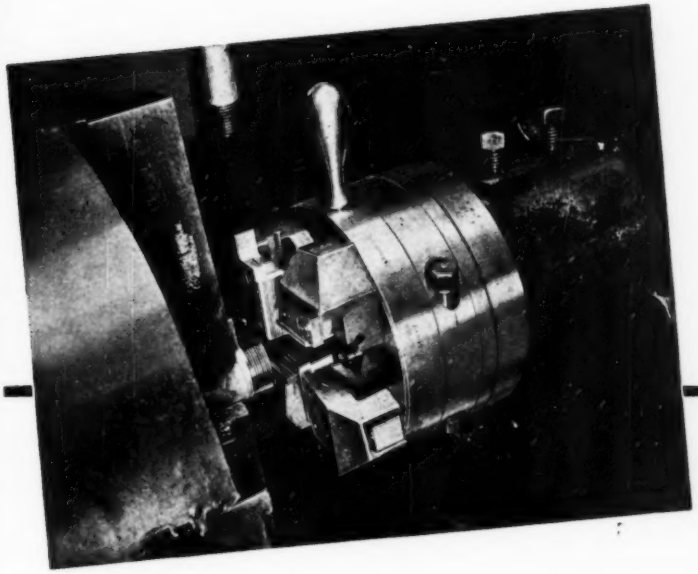
## The LANDIS Machine CO.

# Lead on Threads

## LANDMATIC HEADS

• The permanent nut action of Landis Tangential chasers assures accurate pitch threads throughout on the crown port closing bodies used in bottling machinery. As illustrated, 1⅝" 16 pitch USS threads are cut ½" long on naval bronze forgings. These threads are generated by Landmatic Heads using Landis Tangential Chasers at the rate of 50 SFM. Actual threading time is about 5 seconds.

• The permanent throat feature of the chasers maintains initial cutting accuracy throughout the entire life of the tool. When the chaser is reground, no grinding is done on the throat. Thus the throat angle and nut action is never altered and enables the chaser to consistently produce threads accurate for lead. For further information, on Landis Die Heads & Tangential chasers, write for Bulletins F-80, F-90 & A-50.



These photographs were taken in the Machine Manufacturing Division of the Crown Cork & Seal Company, Inc., Baltimore, Maryland.

LANDIS TRADE MARK REG. U.S. PAT. OFF.

**WAYNESBORO PENNA. U. S. A.**

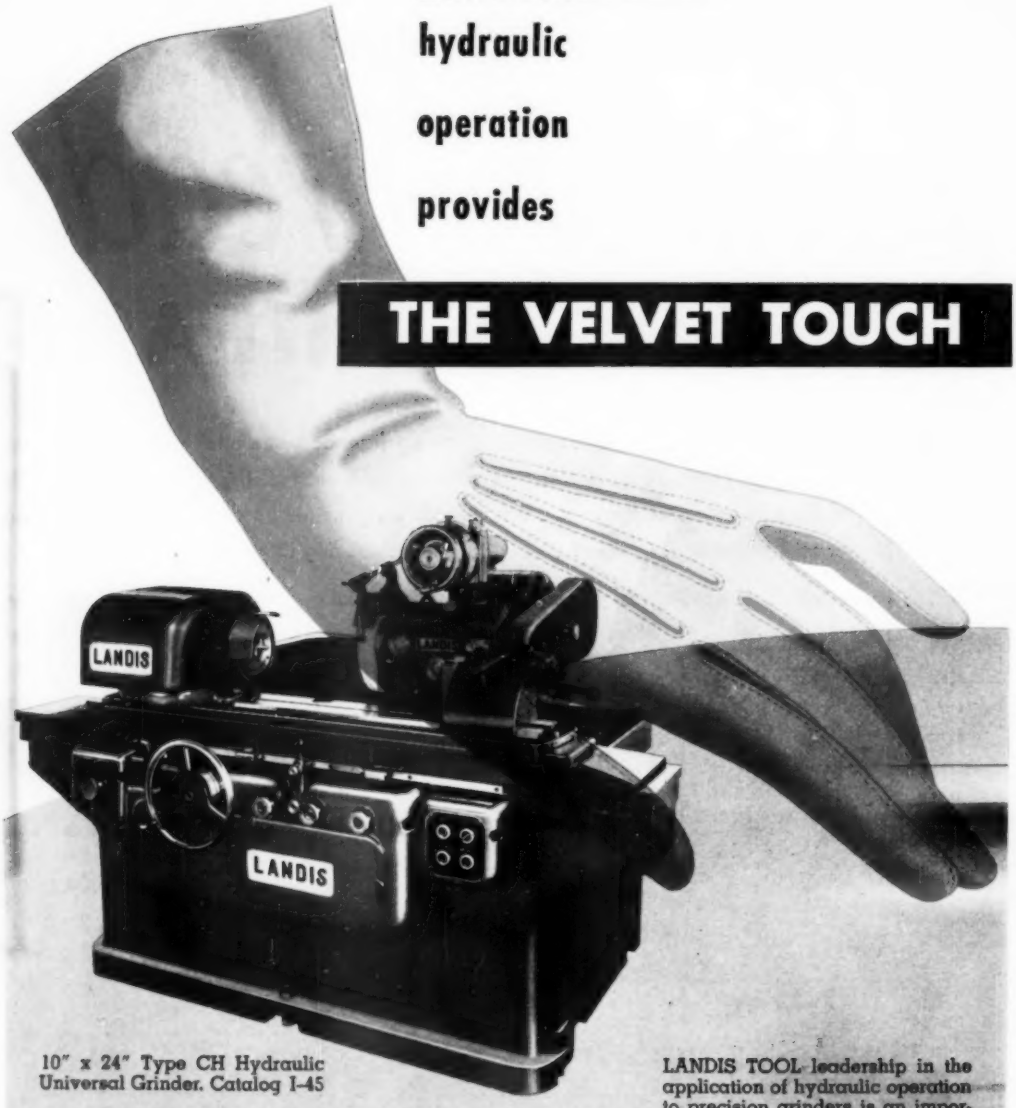
# LANDIS TOOL

**hydraulic**

**operation**

**provides**

## THE VELVET TOUCH




10" x 24" Type CH Hydraulic Universal Grinder. Catalog I-45

EQUIPPED WITH MICROSPHERE BEARINGS

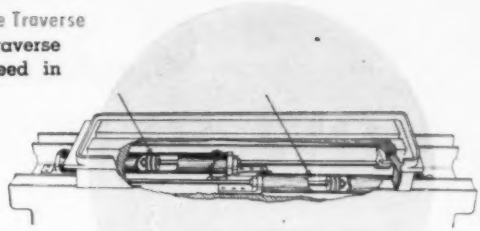
# LANDIS TOOL *Precision Grinders*

LANDIS TOOL leadership in the application of hydraulic operation to precision grinders is an important factor in the high production and fine finish which is obtained on these machines.

We shall be glad to send you, on request, our new condensed catalog which describes the features in more detail and gives condensed specifications for the complete line of LANDIS TOOL standard and special purpose precision grinders.

Smooth Hydraulic Power for Table Traverse

Double cylinder hydraulic traverse gives constant work table speed in either direction.

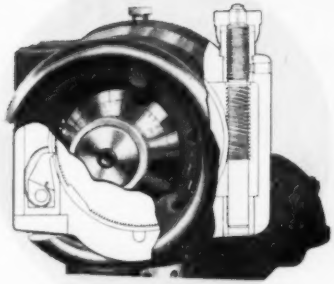


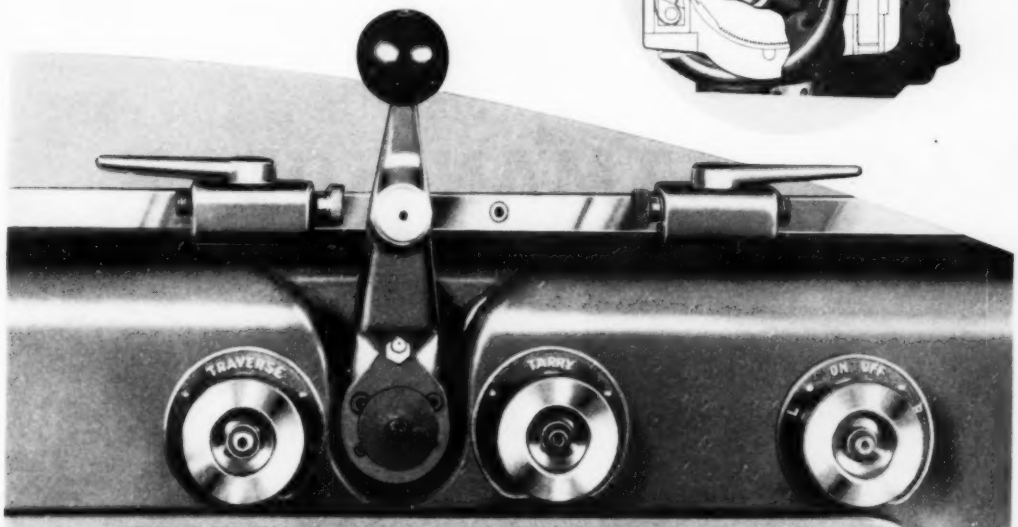
# that Produces Fine Finishes

Hydraulic Automatic Wheel Feed

Lowers Setup Time, Increases Production

At table reversal the wheel feeds up hydraulically by the amount preset on the graduated adjusting knob.






**RATE OF TRAVERSE**
Easily adjusted to fit the grinding job.

**TARRY AT REVERSAL**
Adjustable for type of traverse grinding.

**AUTOMATIC WHEEL FEED SELECTOR**
Conveniently located. Helps to lower setup time.

**features of LANDIS TOOL Hydraulic Universal Grinders**

1. MICROSPHERE WHEEL SPINDLE BEARINGS
2. EYE LEVEL WHEEL FEED
3. HYDRAULIC OPERATION
4. VARIABLE SPEED HEADSTOCK
5. RAPID HYDRAULIC WHEEL POSITIONING
6. SWINGING INTERNAL FIXTURE

LANDIS TOOL COMPANY / WAYNESBORO, PENNA.

# HOW BLISS PRESSES

# ARE IN THE PICTURE

# AT EASTMAN KODAK

A variety of Eastman Kodak parts produced on Bliss presses at the Camera Works.

EASTMAN KODAK'S outstanding success at mass-producing quality photographic equipment at low cost is the result of ever-alert, scientific manufacturing methods. This means that all metal-working machinery must measure up to exacting standards and policies.

Bliss is very much a part of the Kodak picture. The high percentage of Eastman press equipment is Bliss-built, comprising presses of virtually every type.

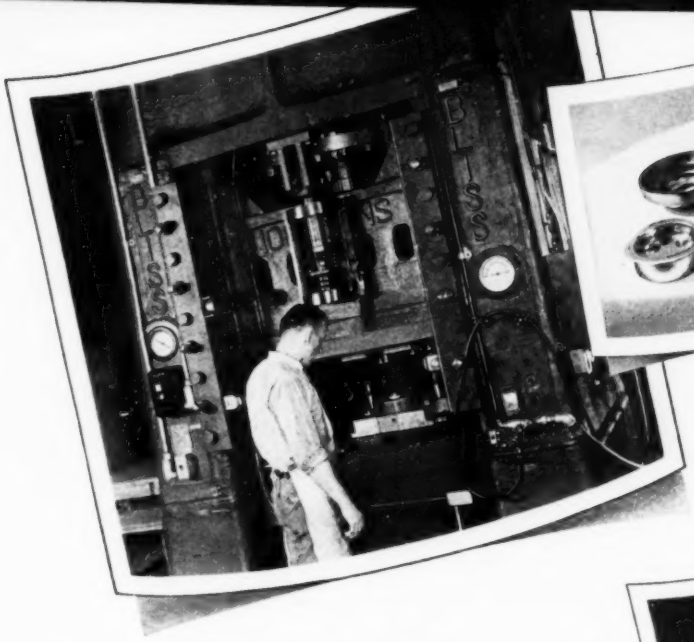
The reasons for Eastman's continuous specification of Bliss are satisfactory performance under intensive operating conditions, prompt maintenance and repair service, and engineering cooperation when new designs and tooling are up for consideration.

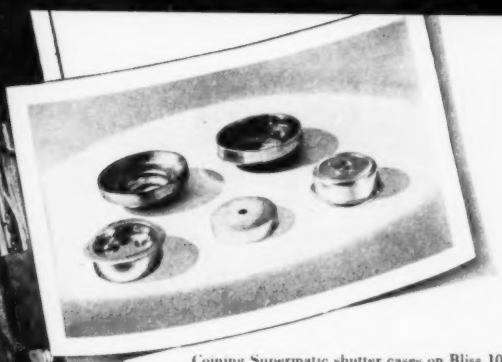
These are the reasons for Bliss' unrivalled leadership wherever you look in the pressed metal field—throughout the automotive, aircraft, railroad, electrical, household appliance and many other industries. It's because Bliss has always built and delivered more than a press: it provides a fund of production engineering knowledge that goes back over 90 years.

You can get the most out of *your* pressed metal production by sending for a Bliss sales engineer today.

**See our Catalog in SWEETS or write for Bulletin No. 35-B**

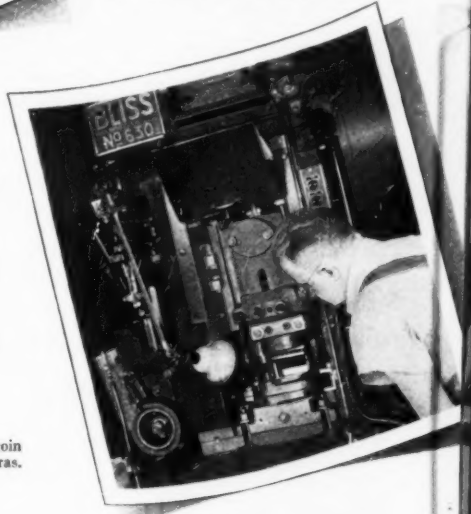
**BLISS BUILDS MORE TYPES AND SIZES OF PRESSES**





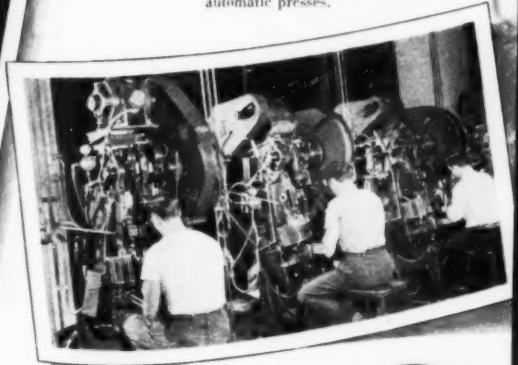
Coining Supermatic shutter cases on Bliss 1000-ton hydraulic press. Inset shows before and after samples. Steps on inside of right-hand sample are held to .001" for position and flatness. Below are blank and two parts of head for tripod. Top part, center, has three depressions—held smooth and hemispherical. Serrations in bottom, right, are accurately radial, sharp and uniform.

# Several hundred presses at Camera Works produce wide variety of equipment




Progressive dies produce various parts for the Baby Brownie Special Camera on Bliss automatic presses.

Close-up of Bliss #307-A press used to coin winding knobs for Kodak Tourist Cameras.



Part of a battery of 45 Bliss #19-C inclinable presses used for a variety of secondary operations. Accuracy is paramount.

**E. W. BLISS COMPANY, DETROIT 2, MICHIGAN**

*Mechanical and Hydraulic Presses, Rolling Mills, Container Machinery*

WORKS AT: Toledo, Cleveland, Salem, Ohio; Hastings, Mich.; Englewood, N. J.; Derby, England; St. Ouen sur Seine, France. SALES OFFICES AT: Detroit, Hastings, Mich.; New York, Rochester, N. Y.; Cleveland, Dayton, Toledo, Salem, Ohio; Philadelphia, Pittsburgh, Pa.; Chicago, Ill.; New Haven, Conn.; Windsor, Ont.

BLISS BUILT

**THAN ANY OTHER COMPANY IN THE WORLD**

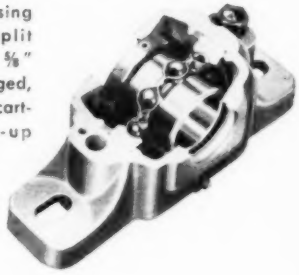
# LINK-BELT offers the "QUALITY QUINTET" in BALL AND ROLLER BEARINGS

### Series 200 ball bearings

Solid or split housing pillow blocks (solid shown) for shafts 5/8" to 3 15/16"—also flanged, take-up, and hanger blocks.

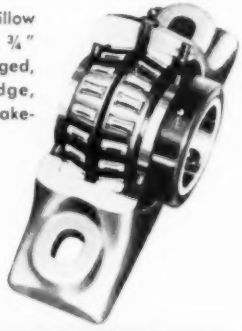
### Series 300 ball bearings

Solid or split housing pillow blocks (split shown) for shafts 5/8" to 3 15/16". Also flanged, flanged cartridge, cartridge and take-up blocks.



### Series 400 roller bearings

Solid housing pillow blocks for shafts 3/4" to 4"—also flanged, flanged cartridge, cartridge and take-up blocks.



### Series 6800-6900 roller bearings

Split housing pillow blocks with adapter sleeves for mounting on commercial shafting of 1 7/16" to 6 15/16" diameter.

Split housing pillow blocks for press-fit on precision-turned shafting of 1.7700" to 7.4800" diameter.

### Series 7800-7900 roller bearings

*SEND FOR CATALOGS!*

**LINK-BELT COMPANY**

Indianapolis 6, Chicago 9, Philadelphia 40, Atlanta, Dallas 1, Minneapolis 5, San Francisco 24, Los Angeles 33, Seattle 4, Toronto 8. Distributors in Principal Cities. 11,485

**LINK-BELT**
**BALL AND ROLLER BEARINGS**

# COUNT

## Mechanically...

Strokes, revolutions, pieces, volumes, lengths . . . or other units of performance and production . . . can be counted by Veeder-Root Mechanical Counters like this new General-Purpose No. 1260. This direct-reading, streamlined counter counts up to 1,000,000 . . . then resets (unless you want to reset it sooner) with one turn of knob. And it's *compact,* so it can be ***built into*** most machines and products, to add utility and marketability.

## Magnetically...

To report machine output direct from plant to office . . . or to count units of a size or weight that makes them tough to count mechanically . . . count on these new Veeder-Root Reset Magnetic Counters, No. 1205 for AC, No. 1248 for DC. Easy to install on regular light circuit . . . widely used with "electric eye." And they may be grouped on panels, at any distance from the machines they report on.

## Manually...

To count people, poles, shrubs, blood-corpuscles, cars, ticket-buyers . . . or anything that can't be counted mechanically or magnetically . . . count on this No. 1023 Hand Tally that fits both hand and pocket. To count one, press thumb-lever once. When count is complete, turn reset knob, start over from zero. Ends errors from memory-count and pencil tallies.

*These are only 3 of the scores of types of Veeder-Root Standard and Special Counters. Most likely you, too, can count on Veeder-Root, to your profit. Write.*

# ON VEEDER-ROOT

**VEEDER-ROOT INCORPORATED**
HARTFORD 2, CONNECTICUT
*In Canada:* Veeder-Root of Canada, Ltd., 955 St. James St., Montreal 3.
*In Great Britain:* Veeder-Root Ltd., Kilspindie Rd., Dundee, Scotland

# You'll Like It in the TOOL ROOM
# You'll Like It on the PRODUCTION LINE
# ...The *new* NORTON 8"×24" SURFACE GRINDER

THIS new Norton surface grinder combines the qualities required for both the tool room and the production line. It is highly adaptable to frequent changes in set up—the condition encountered in the tool room. It has the ruggedness to deliver "all out"—as is demanded by the production line.

**DESIGN HIGHLIGHTS**—Horizontal and vertical ways protected from dust and grit. ★ Saddle well proportioned to give smooth cross feed throughout its full range of travel. Saddle ways and table ways pressure lubricated. ★ Work table operated by hand or hydraulic power with table speeds up to 70 feet per minute in hydraulic power. ★ Automatic hydraulic cross feed eliminates manual truing. ★ Grinding wheel spindle of the cartridge type, motor driven by flat belt; positive end thrust built into the spindle. ★ Hydraulic system is low pressure type with pump and all connections in the base so that any seepage drains back into the reservoir.

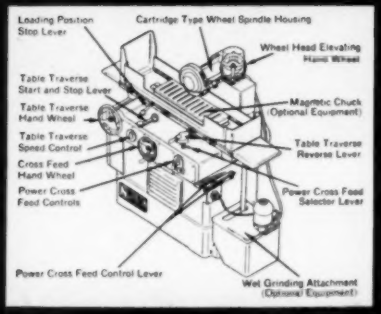
*Write for new catalog*
*No. 190-2—no obligation*

**NORTON COMPANY**
**WORCESTER 6, MASS.**

*Distributors in All Principal Cities*

M-575

Note the simplicity of controls and adjustments, and their location for the utmost convenience of the operator.


Loading Position Stop Lever
Cartridge Type Wheel Spindle Housing
Wheel Head Elevating Hand Wheel
Table Traverse Start and Stop Lever
Table Traverse Hand Wheel
Magnetic Chuck (Optional Equipment)
Table Traverse Speed Control
Table Traverse Reverse Lever
Cross Feed Hand Wheel
Power Cross Feed Controls
Power Cross Feed Selector Lever
Power Cross Feed Control Lever
Wet Grinding Attachment (Optional Equipment)

**NORTON® GRINDERS and LAPPERS**

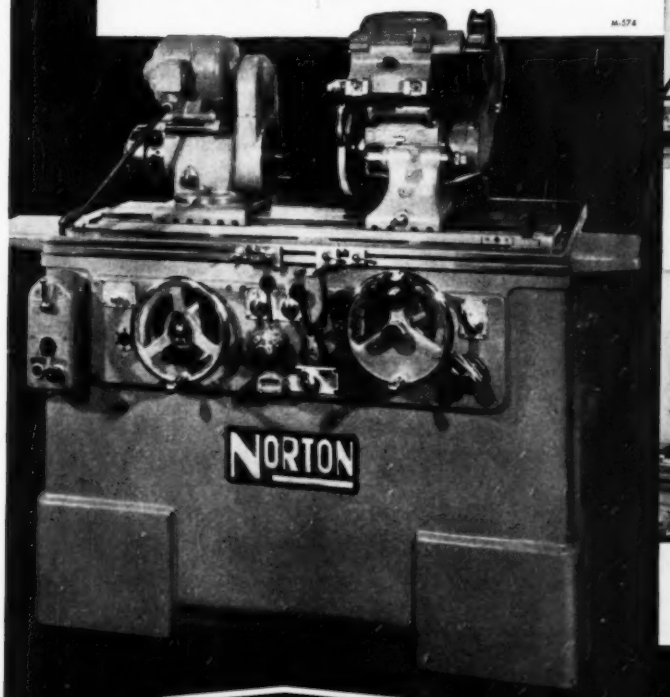
# *Here's a* Handy, *Flexible* Machine *for* TOOL ROOM *and* PRODUCTION WORK
# *...It's the new* NORTON 10"×20" UNIVERSAL

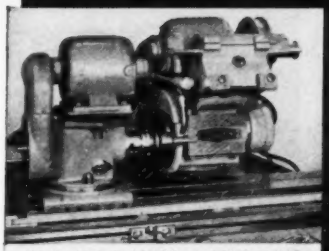
*Featuring*

1. **FLEXIBLE Double-end Headstock**
2. **FLEXIBLE Double-end Wheel Mount**
3. **FLEXIBLE Set-ups for Cylindrical Grinding**
4. **HANDY Internal Grinding Attachment hinged to front of Wheel Slide**
5. **FLEXIBLE Compound Swivel Wheel Slide**
6. **HANDY closely grouped controls**

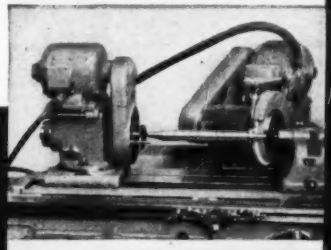
This NEW, flexible NORTON Universal will bring economy to your jobs that require a multipurpose machine of this capacity. It is precise and dependable. Work speed changes from 50 to 500 r.p.m. by fingertip electronic control. Outstanding ease in handling makes it a "must" in tool room equipment programs. A brand new catalog—No. 170-2—tells the complete story. Write for a copy to NORTON COMPANY, WORCESTER 6, MASS.

M-574

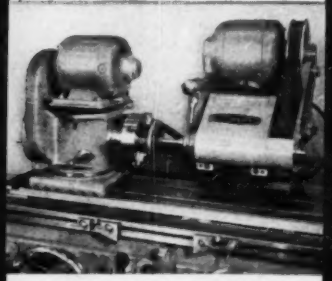


Headstock swivelled 180° (total of 360° possible) for use of conventional or speed chucks. Note center and driver at other end for center type operations.



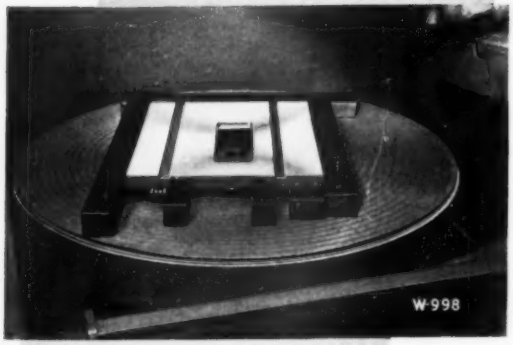
Grinding wheel can be mounted on the right end of the spindle whenever the nature of the job makes this either desirable or necessary. See view above for normal mounting.



Internal grinding with Norton 10" x 20" Universal. Note compact sturdiness of hinged type Internal Grinding Attachment which is quickly brought down into grinding position.

NORTON GRINDERS and LAPPERS

# Put it on the Blanchard



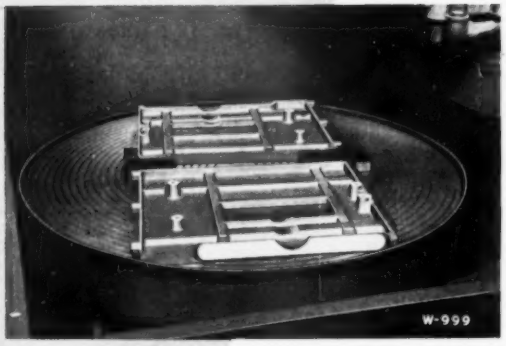

**Material: Aluminum Castings**

**Size: 14¼" x 18"**

**Held on 36" magnetic chuck on the No. 18 Blanchard Surface Grinder by means of suitable steel or cast iron blocking pieces.**

**Proper finishing of these aluminum saw table castings required the removal of 1/16" of metal from both sides, to a flatness of .004". The job was put on the Blanchard No. 18 surface grinder in two operation sequences. The broad side is ground first —*to a flatness of .002"*. The flatness and finish of the Blanchard ground surfaces are such that no other finishing or corrective operation is necessary.**

## They asked for flatness of .004" – They got .002"

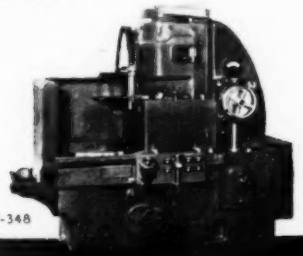



**The second operation permits two pieces being laid flat on the chuck, securely held and thus the reverse side is ground to the same flatness limits.**

**The rate of production is 8½ pieces (17 surfaces) per hour, 8½ of the surfaces being broad and 8½ being narrow or ribbed.**

**The Blanchard Grinding of these aluminum saw tables was the most economical way to produce smooth flat surfaces and meet customers' limits. In this case Blanchard beat the limits asked for by customer. If the surface must be flat and parallel bring it to the Blanchard for best results.**

**Send for your free copy of "Work Done on the Blanchard", third edition. This new book shows over 100 actual jobs where the Blanchard Principle is earning profits for Blanchard owners.**




BLANCHARD

The BLANCHARD MACHINE COMPANY

64 STATE STREET, CAMBRIDGE 39, MASS., U. S. A.

# "AMERICAN"
# HYDRAULIC DUPLICATOR

## *The Latest COST CUTTING Sensation*

Here's a job that's being done in 34 minutes, floor to floor. This includes a finishing cut to reduce grinding time to a minimum. It formerly took 76 minutes to turn and 50% longer to grind.

This marvelous machine will reproduce steps, tapers, right angle and tapered shoulders, recesses, grinding necks and radii and is especially adapted to the production of such work as spindles, motor shafts, valve stems, back shafts, piston rods and axles. It will also accommodate a wide variety of chuck work having irregular contours.

A single hydraulic system is employed for operating the hydraulic tracer valve and the piston which controls the movement of the tool slide carrying the cutting tool. This simplicity is an outstanding feature and insures accurate reproduction, freedom from failures and elimination of work rejects. This new metal cutting technique permits continuous cutting without interruption for measuring or calipering at feeds and speeds to the cutting limit of Cemented Carbide tools. "Miking" on shaft work is confined to the first diameter only after which all other diameters are secured automatically.

This machine may be quickly converted to standard lathe operations.

Descriptive Bulletin No. 35
sent upon request

THE AMERICAN TOOL WORKS CO.
Cincinnati, Ohio, U. S. A.

LATHES AND RADIAL DRILLS

# ARMSTRONG

## ARMSTRONG TOOL HOLDERS

**answer both . . .**

1. **The problem of lowering costs**
2. **The problem of increasing output**

By providing permanent, multi-purpose, inexpensive ARMSTRONG TOOL HOLDERS that use cutters or bits that are quickly ground from standard high speed shapes (Saving: All Forging, 70% Grinding and 90% High Speed Steel), the Armstrong System of Tool Holders will reduce your tool cost to an absolute minimum.

By providing stronger, more efficient tools, carefully developed for each operation, as well as ARMSTRONG High Speed Steel, ARMALOY Cast Alloy Cutter Bits or Armide Carbide-Tipped Cutters as required for each job, ARMSTRONG TOOL HOLDERS permit greatly increased speeds and feeds, enable you to increase the hourly output of every lathe, planer, slotter, shaper, turret lathe and screw machine.

There is no surer way to lower costs and increase output, than to use the correct ARMSTRONG TOOL HOLDER for each operation on all machines.

*Stocked by Leading Tool Departments*

**ARMSTRONG BROS. TOOL CO.**

*"THE TOOL HOLDER PEOPLE"*

5215 W. Armstrong Ave. Chicago 30, U.S.A.

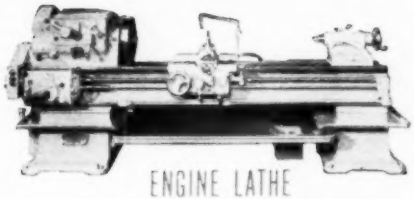
*New York and San Francisco*

***Write for New S-48 Catalog just released.***

# SPRINGFIELD LATHES

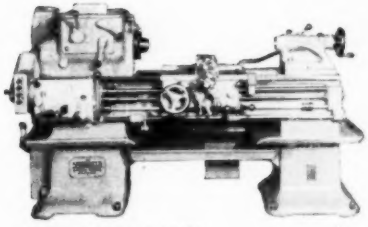
## Solve every lathe turning problem

Adaptability to every lathe turning problem and extreme versatility are characteristic of Springfield Lathes. Built with close precision and strict adherence to the highest standards for each component part, they are rugged, reliable, accurate performers on all types of work.



ENGINE LATHE

Anyone of the 16 speeds can be selected quickly and easily to meet the requirements of the tool and the work. Low speeds for heavy cuts or high speeds for carbide cutting tools are instantly available. The Springfield 3-lever speed shifting system reduces the amount of shifting required in the normal sequence of operations.



TOOL ROOM LATHE

Sixty quick change threads and feeds give an exceptionally broad setting for many kinds of work. Threads such as 11½ and 27 pitch which usually require transposition gears are included in these ranges and the standard feeds and threads can be varied greatly.

Easy to set up and operate, these modern lathes are noted for their wide application and their accurate, sustained performance on all lathe turning work. Ask about their adaptability to your own turning problem. Springfield Lathes can solve them—and on a high production schedule.

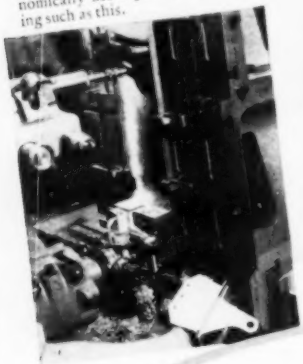
**THE SPRINGFIELD MACHINE TOOL COMPANY**

SPRINGFIELD, OHIO, U. S. A.

GENERAL DISTRIBUTORS: BRYANT MACHINERY & ENGINEERING COMPANY, 400 WEST MADISON ST., CHICAGO 6

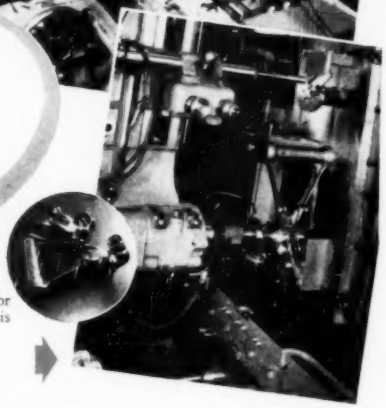
*Exclusive Representatives in All Principal Cities*

Aircraft parts production on an experimental basis is swiftly and economically accomplished by Kellering such as this.



Another tricky part for experimental aircraft work. Imagine trying to produce parts like this in small lots by any other means. Kellering saves a terrific amount of time and money.

Small lots of aileron control cams are produced with accuracy and dispatch by Kellering.



# "KELLERING"

**...A SHORTER WAY OF SAYING**

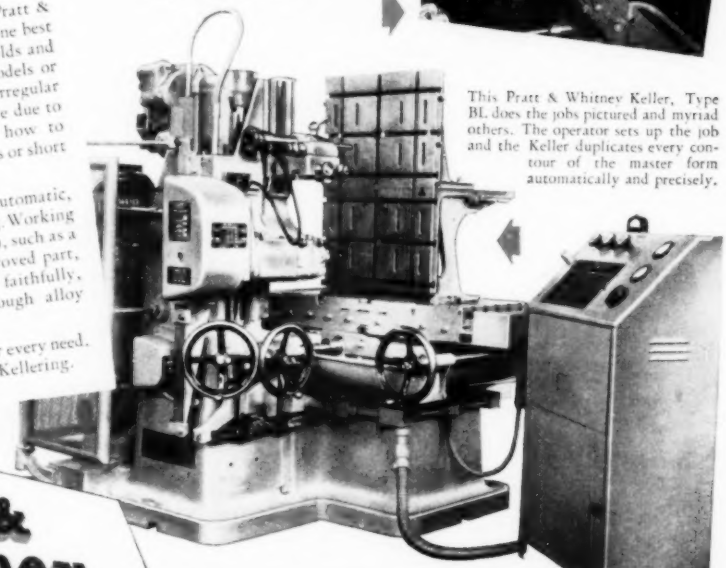
**"fast, low cost duplication of parts in experimental lots or for short run production."**

Difficult to duplicate? Not for the P&W Keller. It takes this catapult hook in stride.

**Has it occurred** to you that Pratt & Whitney *Keller* machines offer the one best way to duplicate not only dies, molds and patterns but actual parts, pilot models or production components, however irregular or intricate in shape? If not, you're due to revolutionize your thinking on how to turn out pieces in experimental lots or short runs.

**Kellering is,** in essence, automatic, electric, tracer-controlled milling. Working from an easily made master form, such as a light metal template or an approved part, it reproduces the desired shape faithfully, quickly, economically — in tough alloy steel or other material.

There is a Keller machine for every need. Write for the whole story on Kellering.



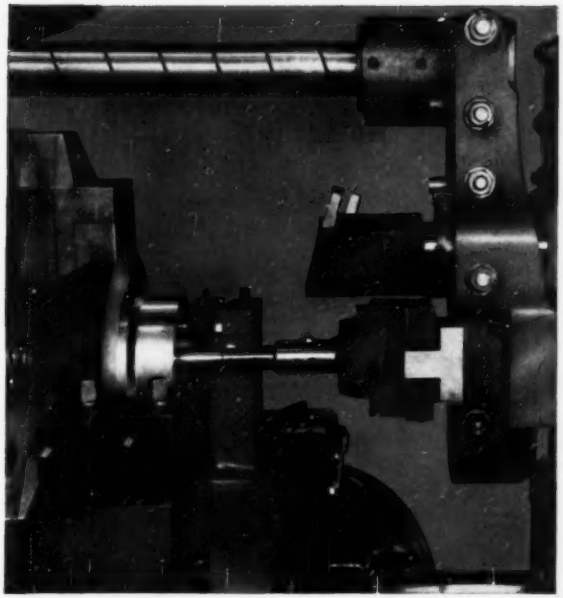
This Pratt & Whitney Keller, Type BL does the jobs pictured and myriad others. The operator sets up the job and the Keller duplicates every contour of the master form automatically and precisely.

**Pratt & Whitney**

**Division Niles-Bement-Pond Company**

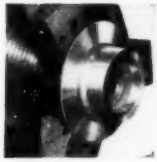
**WEST HARTFORD 1, CONNECTICUT**

**Keller Machines**



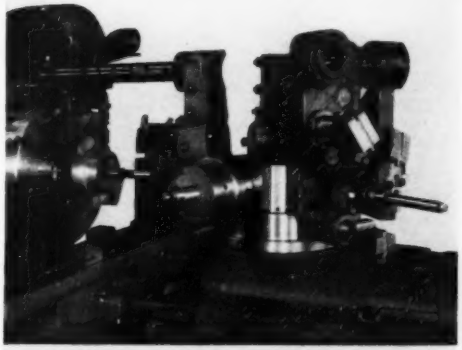
# RIGIDITY typical of *tooling by P&J*

Speed in the roughing and fine finishing of the spherical seat of this casing is based on the extremely rigid setup of the radial ground form tools. The 6-DRE's lowest feed of .007", with a speed of 55 fpm, is used to obtain the final smoothness and accuracy. Material: Bellmaloy, Brinell 179 to 207 Tooling: Tungsten Carbide.



Twenty-seven operations on a differential case in 9.6 minutes, floor-to-floor, with the P&J 6-DRE. Profitable? Of course it is . . . with P&J Automatics tooled by P&J!

Potter & Johnston tool engineers are expert at tooling up these powerful machines and coming up with record floor-to-floor times. Get a P&J estimate by sending a sample of your work . . . there's no obligation.



**SEQUENCE OF OPERATIONS FOR FULL AUTOMATIC CYCLE AS TOOLED BY P&J**

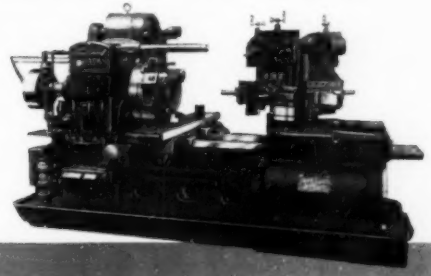
**1st TF** — Rough bore 2 dias. Face seat. Rough form spherical seat. Bore dia. Rough turn 2 dias. Rough face flange. Face end.

**2nd TF** — Finish above operations. Chamfer.

**3rd TF** — Finish face seat. Finish face end.

**4th TF** — Ream. Size bore. Size turn 7.625" dia.

**5th TF** — Finish form spherical seat. Finish face seat. Face end.



## 6-DRE AUTOMATIC

**Potter & Johnston Company**

Pawtucket, R. I.

subsidiary of Pratt & Whitney Division Niles-Bement-Pond Company

P&J

*A note on Abrasives*

# Producing more Abrasives to higher standards ...and what it means to you

In mill, plant and shop, abrasives are continuing to assume greater importance as tools to produce more and better products at lower cost. New technical developments are requiring the use of abrasives in quantities beyond the production capacity of a few years ago. And, new alloys, different materials, faster production techniques and more exacting engineering requirements are calling for improved abrasive products of superior quality. To meet these demands, The Carborundum Company has marshalled all of its specialized technical knowledge, manufacturing resources and service facilities. The bonded abrasive or coated abrasive of today resembles its predecessors of yesterday in general appearance only. It is a different and better tool. It is designed to far more exacting specifications. Its basic ingredients are improved. It is made by newly developed methods. Abrasives by CARBORUNDUM are now produced in larger quantities in new and recently expanded plants to meet our customers' increased abrasive requirements. If you are looking for assurance in obtaining the best in abrasives, and abrasive service, follow this simple rule: specify abrasives by CARBORUNDUM. The Carborundum Company, Niagara Falls, New York.

**The only complete line of Abrasive Tools is**

**CARBORUNDUM**

TRADE MARK

*"Carborundum" and "Aloxite" are registered trademarks which indicate manufacture by The Carborundum Company*

# Engineering News
## ON ABRASIVE PRODUCTS

### MX Discs and MX Depressed Center Wheels Offer Advantages in Many Applications

Fast cutting... long life... ease in use... and, safety—these are four reasons why MX Discs and MX Depressed Center Wheels by CARBORUNDUM are getting increased use. Their sharp cutting action and extra durability are especially desirable on operations that prove too heavy for ordinary sander discs. They are particularly effective on rough jagged surfaces presenting a severe dressing problem. They are also effective on such jobs as smoothing castings and welds, stock removal and clean-up work, where wearability rather than extreme flexibility is the important factor. They are usable down to practically the arbor hole.

MX Discs and Wheels by CARBORUNDUM are available in 7" and 9⅛" diameters for use on all standard portable disc sanders, air or electric. To obtain maximum safety, full sander pad support is recommended. The D2N.S. sander pad is provided for this purpose.

### Correct Selection of Abrasive Grains Results in Improved Polishing

The abrasive grain is the key to uniform finish in polishing a metal surface. For this reason, different types of abrasives by CARBORUNDUM have been developed, with definite characteristics, to provide efficient performance under varying conditions.

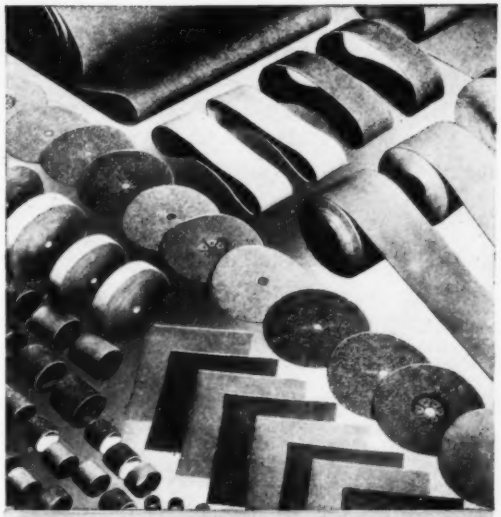
**ALOXITE TP** aluminum oxide grain is tough and blocky. It gives excellent service on operations involving considerable stock removal and is recommended for polishing all types of steel and other metals of high tensile strength.

**ALOXITE TPT** grain is also used where the removal of large amounts of metal is desirable. It is extra tough and sharp, treated to assure effective adhesion with cold cement or glue.

**ALOXITE TPC** grain is of medium sharpness and is treated to assure effective adhesion with cold cement.

**ALOXITE TPL** is extremely sharp and friable. Due to its friable nature, it fractures during use, constantly presenting new sharp-cutting edges to the work surface. Loading is minimized. It is ideal for polishing metals of low tensile strength.

Accurate grading assures a uniform size, free from oversize material that cause deep scratches, and free from an excess of finer materials that tend to slow production. The angular shape assures maximum cutting edges. Flats and slivers, with no cutting value, are eliminated. Through chemical and physical controls, grains of uniform strength and temper are assured.



**COATED PRODUCTS** — SHEETS • ROLLS • BELTS • DISCS SPECIAL SHAPES

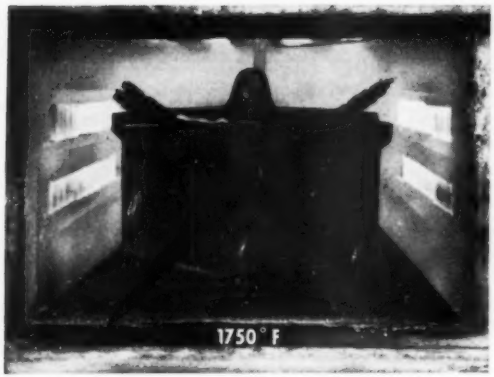
**BONDED PRODUCTS** — ABRASIVE WHEELS • STICKS, STONES AND RUBS • SPECIALTIES • SUPERFINISHING STONES • SPECIAL FORMS • ABRASIVE GRAINS AND FINISHING COMPOUNDS

FOR EVERY ABRASIVE APPLICATION
...CALL IN
CARBORUNDUM
TRADE MARK

# How This New Air-Hardening Tool Steel

## *Lowers Your Tooling Costs!*

**Easy, Low Temperature Heat Treatment!**
**Uniform Hardening in Very Heavy Sections!**



## —and here are the extra advantages you get by using VEGA:

- Minimum Distortion and Size Change
- Resistance to Decarburization
- Freedom from Excessive Scaling in Hardening
- Good Machinability
- High Degree of Toughness with Good Hardness to Resist Shock and Wear.

---

**NOW . . .**

to make identification quick and easy, the entire surfaces of all bars are painted *full length*—each grade with its own distinctive color!

**THE CARPENTER STEEL COMPANY · 109 W. BERN STREET · READING, PENNSYLVANIA**

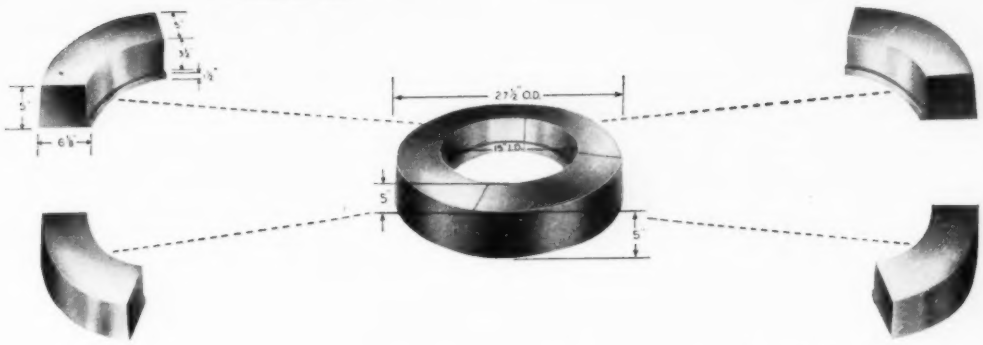
In *Vega* you now have an air-hardening tool steel that can be heat treated from a temperature 200°F *lower* than the 5% chromium air-hardening steel! As a result, expensive pack hardening to avoid excessive scaling can often be eliminated. And because the hardening temperature of *Vega* is only 1550°F, you need no special high temperature furnaces.

Start now to cut costs on jobs such as blanking, piercing, trimming and forming sheet metal in light and heavy gauges. You can get *immediate* delivery of *Vega* in standard sizes from nearby Carpenter Warehouse or Distributor stocks. For complete information and fast delivery, call Carpenter, today.

# VEGA

U. S. Pat. 2,356,224

Rerounding die used on 14" extra heavy SAE 1020 pipe, 1.406" wall. VEGA was selected to provide deep hardening in large sections and minimum movement and deformation in heat treatment. 60 sections made from VEGA were hardened and drawn to Rockwell C-59—*with no variation in hardness in the entire lot!* And because VEGA could be heat treated at a lower temperature, expensive pack hardening to avoid excessive scaling was eliminated.




**IMMEDIATE DELIVERY FROM LOCAL STOCKS!**

***Call Your Nearest Carpenter Warehouse or Distributor***

Atlanta • Baltimore • Boston • Bridgeport, Conn. • Buffalo • Chicago • Cincinnati • Cleveland • Dayton • Detroit • Grand Rapids, Mich. • Hartford • Houston • Indianapolis • Kansas City • Los Angeles • New York • Philadelphia • Providence • St. Louis • Worcester, Mass. • In Canada: Toronto • Montreal.

**Export Department, 233 Broadway, New York 7, N. Y. "CARSTEELCO"**

*Carpenter*

**MATCHED**

**TOOL & DIE STEELS**

# EXCLUSIVE IN DANLY PERMITS

## Longer Clutch Life Because:

1. Greater mass is in continuous rotation, resulting in lower starting torque, less heat.
2. Heavy circular friction discs last longer — more than 8,000,000 engagements with negligible wear under test.
3. Positive air circulation dissipates heat, cooling all clutch elements.

## HOW IT WORKS

Air-operated, the DANLY clutch responds instantly to convenient push button electrical controls. Low energy clutching is obtained with an exclusive design which requires starting only one-fifth of the mass that is subject to acceleration in conventional press clutches.

### LOWER STARTING TORQUE AND INCREASED FLYWHEEL ENERGY

Only the comparatively small weight of the drive shaft, the friction discs and retainer wheels are started and stopped in each press cycle. The greater mass, back-up plates, cylinder and piston, and clutch housing are in continuous rotation, actually increasing effective flywheel energy. This results in lower starting torque, more sensitive stop and go for repeated "inching" and single-stroking operations, with much less heat generated.

### COOL OPERATION ASSURES LONG LIFE

*Clutch maintenance* usually comprises the largest share of press "down time" for repairs. Heat generated by the clutching action is the greatest cause of clutch failure. What heat is generated in the DANLY clutch is quickly dissipated by forced air circulation, before any undesirable temperature rise can occur. This cool operation contributes to long life of the friction discs and all non-metallic elements of the clutch. A centrifugal fan, built into the clutch housing, draws in a large volume of air. Air circulates through ample passages around all working parts.

### PRESS DOWNTIME AND STAMPING COSTS REDUCED

Thus, in DANLY mechanical presses, "down time" for clutch servicing is substantially reduced and long service life assured by advantages of the efficient DANLY friction clutch. Uninterrupted work means *more profitable press operation.*

### ENGINEERING ASSISTANCE

Danly engineers can help you in solving problems pertaining to stampings and press operation. Send full details for specific recommendations. No obligation.

*Free*

### LITERATURE

Get the complete story! Learn how DANLY Presses can contribute to lower costs and increased production—write for literature today.

**DANLY MACHINE SPECIALTIES, INC.**
2100 South 52nd Avenue, Chicago 50, Illinois

DANLY

MECHANICAL PRESSES AND PRESS EQUIPMENT

# CLUTCH DESIGN
# MECHANICAL PRESSES
## *Profitable Uninterrupted Operations*

### *Other* DANLY PRESS *Advantages*

**BUILT-IN AUTOMATIC LUBRICATION** — Circulates clean filtered oil continuously to all bearing surfaces in the crown and slide.

**NEW PITMAN WRIST-PIN DESIGN**—3-point support for wrist pin eliminates shearing and minimizes deflection. Simplified design permits precision fitting of parts.

**ALL-STEEL WELDED FRAME**—With box-type uprights. Weldments are stress relieved for permanent alignment.

**MASSIVE DESIGN**—All members built to carry loads of rated press capacity. Extra rigidity maintains accurate die closure, even under heavy off-center loading.

**PRESS SAFEGUARDS**—Press cannot be operated until both air and oil pressures are raised to the required level. The press is stopped if either drops below the safety point.

**OPERATOR SAFETY**—To start press, "run" buttons must be pressed simultaneously, requiring operator's hands to be clear of the press.

**SIMPLE CYCLE SELECTION**—Danly controls are installed and press-tested to save installation time — include 5 position selector switch and reversing circuit.

25 YEARS OF DEPENDABLE SERVICE
TO THE STAMPING INDUSTRY

# AMERICA'S MOST CRITICAL BUYERS SPECIFY

FRACTIONAL HORSEPOWER GEARING

GS

*The Roberton Division of King Pneumatic Tool Co., Chicago, specified G.S. Gearing exclusively for their new ROBERTON Electric HEDGE TRIMMER pictured here.*

WHEREVER dependable, *really rugged* service is required, that's where you'll usually find Fractional Horsepower Gearing by G.S.! The superior excellence and the almost uncanny *uniformity* of G.S. Small Gearing has now become practically legendary among particular buyers all over our country. Year after year G.S. Small Gears are used for old products as well as many remarkable *new* applications such as the one illustrated on this page. The secret of G.S. quality lies in more than thirty years of intensive specialization, "years of doing ONE THING *consistently better*"! If you need *quantities* of *better, more uniform* Small Gearing, by all means make use of our highly developed "know-how" and facilities. Without obligation let a skilled G.S. Engineer give you ideas, suggestions and cost estimates. Write or phone today!

SEND FOR *our 4 page catalog bulletin illustrating and describing many different types and applications of G.S. Small Gearing. It may offer valuable suggestions and ideas you can use. Write today.*

# GEAR Specialties

Spurs • Spirals • Helicals • Bevels • Internals • Worm Gearing • Racks • Thread Grinding

MEMBER OF AGMA

2635 WEST MEDILL AVENUE • CHICAGO 47, ILLINOIS

WORLD'S LARGEST EXCLUSIVE MANUFACTURERS OF FRACTIONAL HORSEPOWER GEARS

# THE GREENFIELD STORY

*of Service and Quality*

## "Built-In"

THE tap is not a tool whose value can be told by its looks. It is only in its performance that its merit becomes manifest. If it threads thousands of holes at high speeds with undeviating accuracy, it is a good tap. Its true value is built into it by the maker in his selection of steel, his workmanship, and his refinements of design that are rarely visible to the eye. There is, we believe, still another important "built-in" value in "Greenfield" taps. It is the service which is available to the tap user from the distinguished list of distributors who stock the "Greenfield" line from coast to coast; and the on-the-spot help which is available from the trained "Greenfield Man" on any threading problem at any time. *Such "built-in" values are an important chapter in the "Greenfield" story of service and quality.*

GTD

**GREENFIELD TAP and DIE CORPORATION**
Greenfield, Massachusetts

and

GEO MET RIC

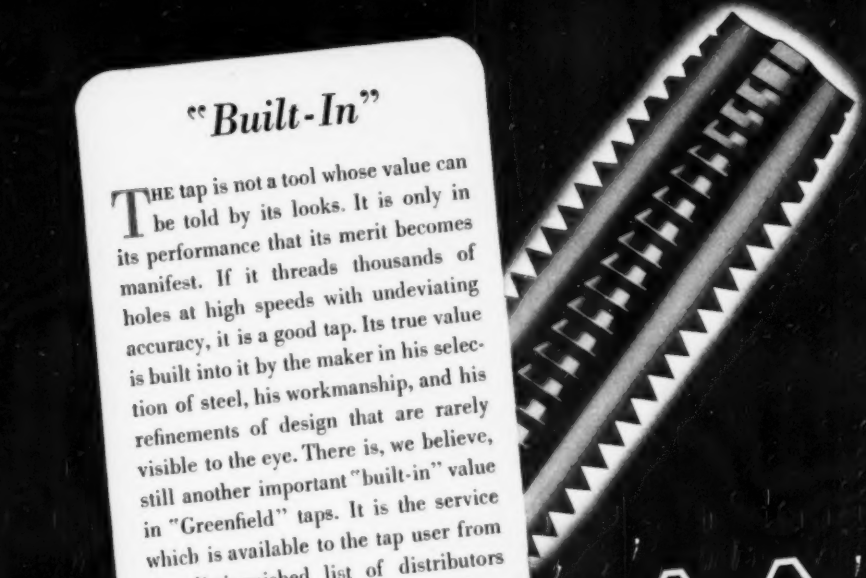
**THE GEOMETRIC TOOL CO.**
New Haven 15, Connecticut

and

GTD AMPCO

**AMPCO TWIST DRILL CORP.**
Jackson, Michigan

Divisions of Greenfield Tap and Die Corporation

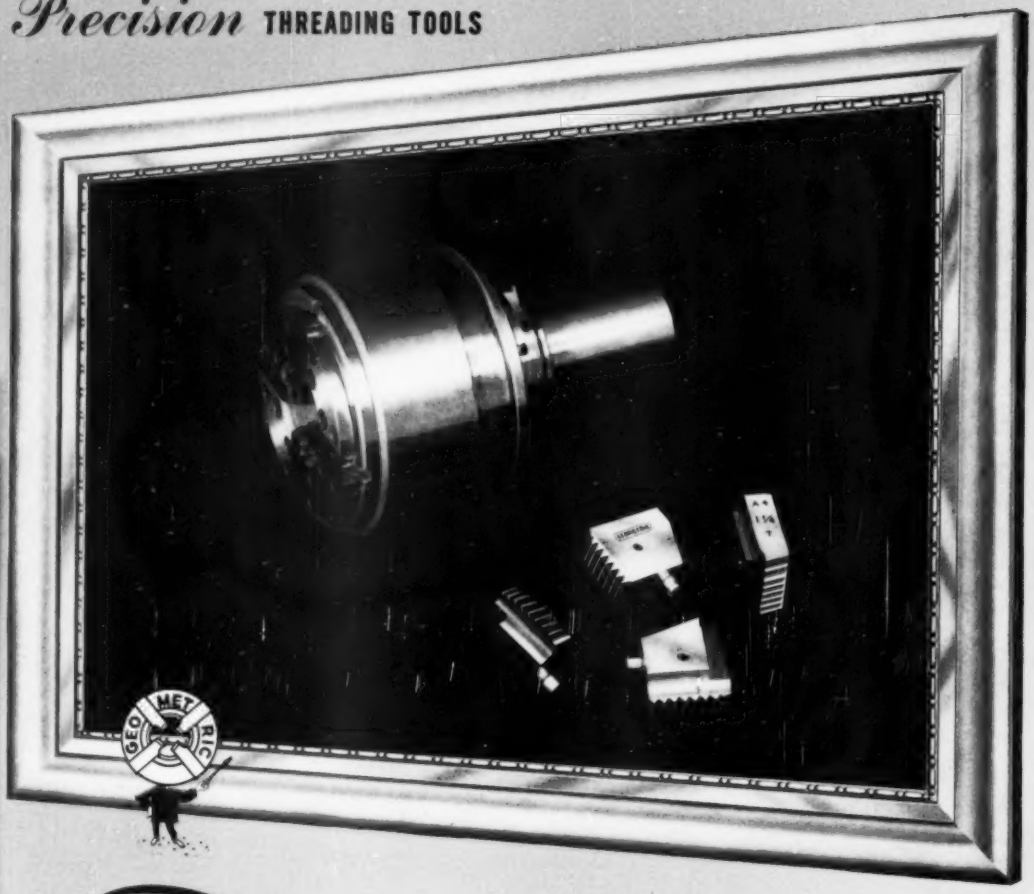


GTD

GREENFIELD

*Be Sure*
*Buy "Greenfield"*

*Precision* **THREADING TOOLS**




# *Rotary* Style KD Die Head and Chasers

This Self Opening Die Head is for use on live spindle machines, particularly automatic screw machines.

★ ★

Available in six sizes, with a cutting range from 1/16" to 2½".

★ ★

GEOMETRIC also makes a complete line of Self Opening, Stationary and Solid Adjustable Die Heads — and Collapsing and Solid Adjustable Taps. *Write today for further details.*

"Be Sure ... Buy Geometric"

THE
**GEOMETRIC**
TOOL COMPANY, NEW HAVEN 15, CONNECTICUT

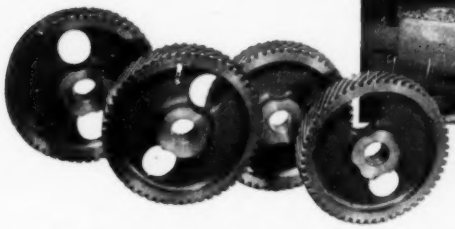
GTD

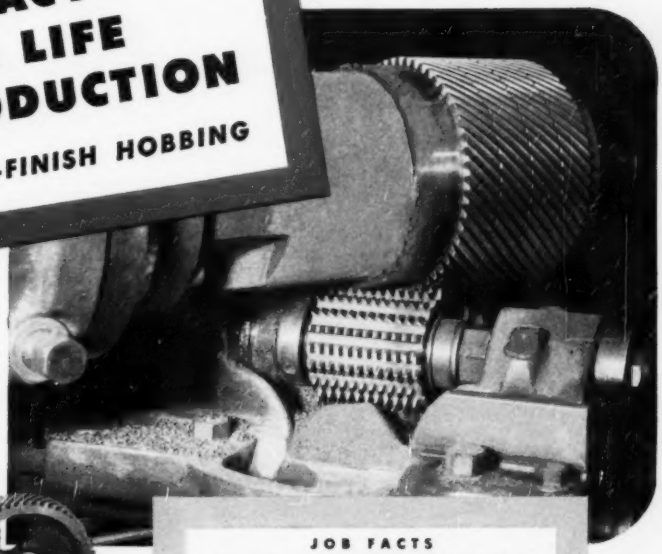
GTD AMPCO

# Get ACCURACY TOOL LIFE and PRODUCTION WHEN SEMI-FINISH HOBBING

Use

**BARBER-COLMAN "Multithread" HOBS**





**JOB FACTS**

Operation — Semi-Finish Hob Helical Gears, 4 per load, 10 pitch, 54 teeth, 7" O.D.
Machine — Barber-Colman No. 16-16
Material — Cast Iron
Hobs — B-C "Multithreads" 4" x 4" x taper bore
Fl-to-Fl — 25 minutes per load
Feed — .065"/per rev.
Speed — 82.5 RPM
Tool Life — 800 pieces per hob sharpening
Accuracy — within .0006" involute

*"Multithread"* Hobs are the newest contribution to high speed gear hobbing. With these new *"Multithreads"*, gears are hobbed more rapidly so that frequently the number of machines required for semi-finishing can be greatly reduced. Their capacity for accuracy, tool life *and* production is established by their performance in this and many other jobs.

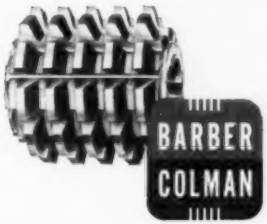
On these truck camshaft gears, for example, hobbing time has been cut *one-third*. Tool life averages 800 pieces per sharpening. Tolerances within .0006" are maintained on involute and pitch diameter.

Check these Job Facts and see if they compare with results on your semi-finishing jobs. Write Barber-Colman Engineers for estimates on your work.

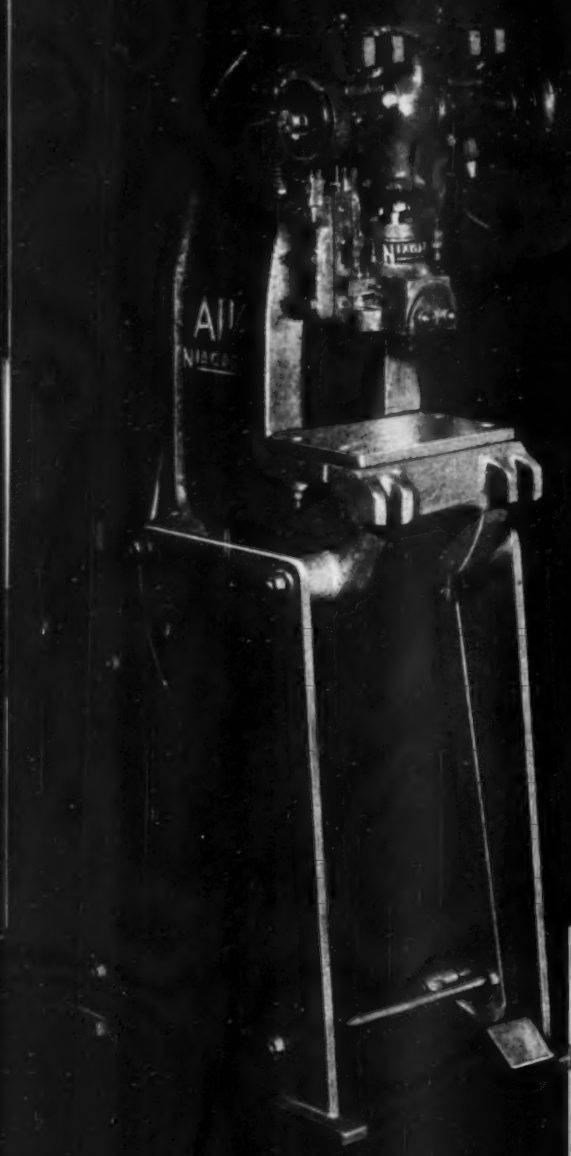
## Barber-Colman Company

GENERAL OFFICES AND PLANT, 3117 LOOMIS ST., ROCKFORD, ILLINOIS, U. S. A.

**COMPARE THESE JOBS!**
Production records on 100 hobbing jobs. Write for Hobbing Data File No. 3117.



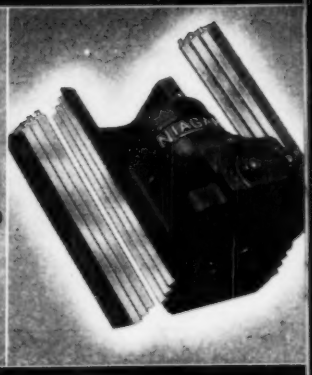
# ONLY



● You get the same advanced design in small Niagara Inclinable Presses as you get in the largest sizes. Don't overlook the importance of this because small presses run as much as 6½ times as fast as large presses. Regardless of size you get quality when you get Niagara Inclinable Presses.

*Instant Engagement* of the Sleeve Clutch as compared with the slower action of other mechanical press clutches produces more work strokes per hour.

*Multiple "V" gibs* provide more guiding surface which minimizes wear, maintains alignment of slide with bed and thus increases die life.



NIAGARA MACHINE & TOOL WORKS • BUFFALO 11, N. Y.

# NIAGARA

## SMALL INCLINABLE PRESSES

*Give you all these*

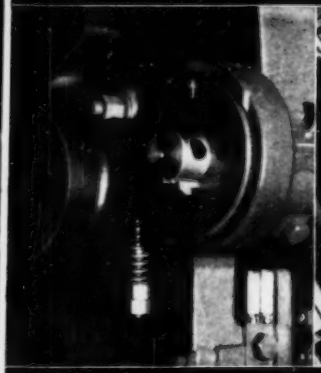
## BIG PRESS FEATURES

*Brake automatically* compensates for wear as well as expansion due to heat of operation. Drum and band marked to indicate correct adjustment.

*Slide designed* to assure solid backing for die from center to front as well as rear. Breech block die clamp gives solid backing to punch shoe.

*Frame designed* to provide solid gib mountings, strength at the crankshaft bearings and a rigid gap maintaining close alignment of punch and die.

*Inclining mechanism* easily operated by one man. Working height is not materially changed when press is inclined.

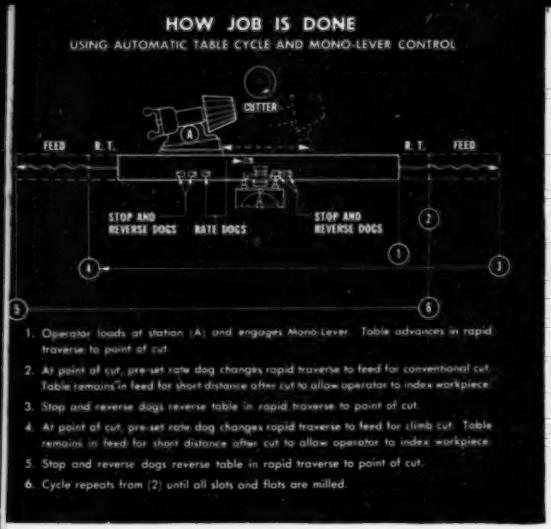


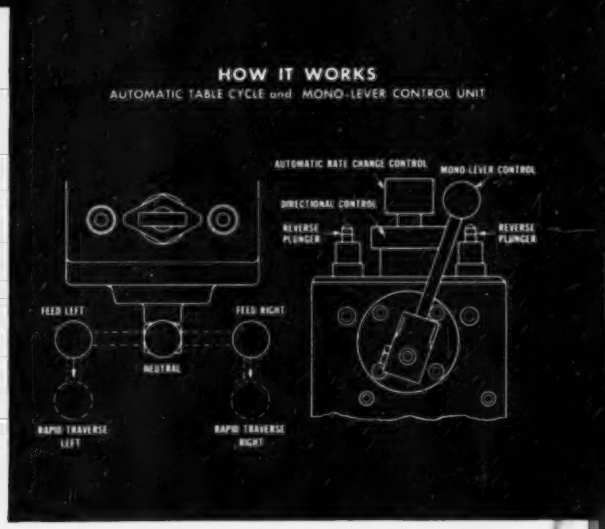
DISTRICT OFFICES: DETROIT • CLEVELAND • NEW YORK

*Photo and job data courtesy Brandt Automatic Cashier Company, Watertown, Wisconsin*

Here's a picture of modern profit-making in action! The part: A cast aluminum coin-machine part. The job: Simultaneously mill slots and flats between slots. The machine: A Kearney & Trecker Model 2H Plain Automatic Cycle Milling Machine with *Mono-Lever* Table Control. Results: Over 96% increased production on this part — *plus* more uniform, more accurate results — *plus* reduced operator fatigue. Average tolerance on slots — .0003", flats — .001". Cutters: HSS. See sketch for details on how new *Mono-Lever* Control and Automatic Table Cycle makes these big savings possible.

# Looking for savings? SEE MACHINE INCREASED


HOW JOB IS DONE
USING AUTOMATIC TABLE CYCLE AND MONO-LEVER CONTROL
CUTTER
FEED
R. T.
R. T.
FEED
STOP AND REVERSE DOGS
RATE DOGS
STOP AND REVERSE DOGS
1. Operator loads at station (A) and engages Mono-Lever. Table advances in rapid traverse to point of cut.
2. At point of cut, pre-set rate dog changes rapid traverse to feed for conventional cut. Table remains in feed for short distance after cut to allow operator to index workpiece.
3. Stop and reverse dogs reverse table in rapid traverse to point of cut.
4. At point of cut, pre-set rate dog changes rapid traverse to feed for climb cut. Table remains in feed for short distance after cut to allow operator to index workpiece.
5. Stop and reverse dogs reverse table in rapid traverse to point of cut.
6. Cycle repeats from (2) until all slots and flats are milled.



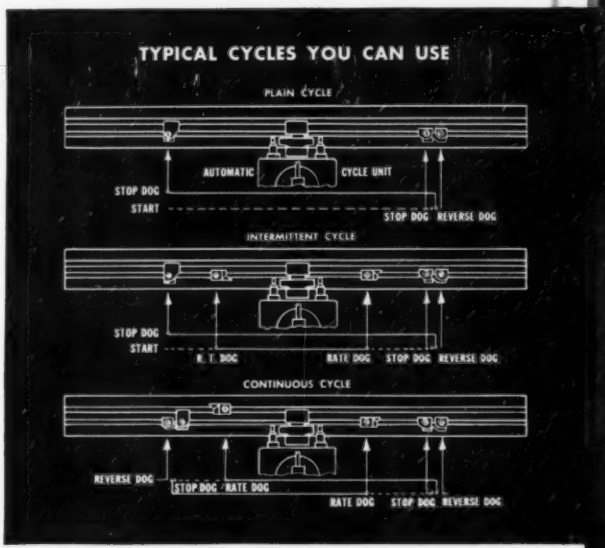

**NOTE SIMPLE STEP-BY-STEP OPERATION** sequence on this job. Table cycle is pre-set to fit operator's required indexing time. Table feed screw with adjustable nut eliminates backlash so climb and conventional cuts are taken with equal ease.

**THINK OF IT!** Now you can have all the advantages of this great cost-cutting feature plus the all-around versatility of general purpose, knee-type machines . . . faster, easier control for greater production with less operator fatigue.

THE plain facts of this job show you in practical terms what Kearney & Trecker research and development gives you — *greater production at lower cost!*

The machine shown is one of a great new, complete line of Kearney & Trecker knee-type milling machines with Automatic Table Cycle and *Mono-Lever* Control. They give you profit-making advantages never before available on knee-type machines. They combine the versatility and working range of knee-types with the automatic, high production of bed types. Hand control of the table is done by simple movement of ONE LEVER — substantially reducing idle cutter time and operator fatigue.

EQUALLY important to you is the opportunity for proper machine selection. You neither *over buy* nor *under-buy*, but you buy *right* when you choose from the 56 machines in this new Kearney & Trecker line. For startling facts about these machines and their application to your milling work, consult a Kearney & Trecker Sales Representative today. He's schooled in the "know-how" and he's at your service. For detailed information, contact him or write us direct. Ask for Catalog No. AC-10A. Kearney & Trecker Corp., 6784 W. National Ave., Milwaukee 14, Wis.



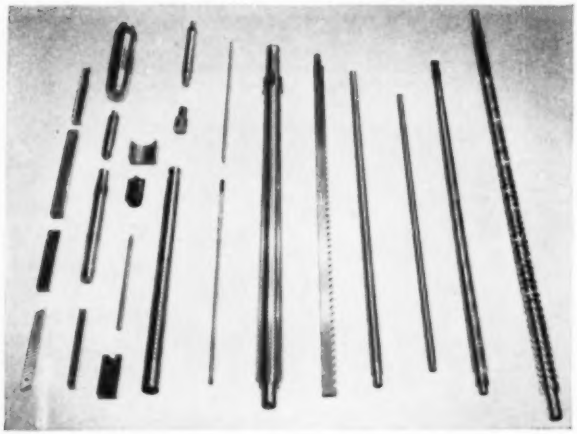

**THREE DIFFERENT TYPICAL CYCLES** to accommodate various job set-ups. Using the completely automatic cycle feature effects substantial savings for lots of 10 or more pieces. Cycle can be set for loading and unloading time — and can be reversed in feed or rapid traverse.

# HOW ONE NEW MILLING PRODUCTION OVER 96%

BECAUSE *American* ENGINEERS ALL 3 { BROACHES / FIXTURES / BROACHING MACHINES

# *American* BROACHES SERVE YOU BETTER

Higher production at lower cost . . . on most metal cutting jobs . . . that's the big advantage in broaching. But, getting the full benefits of broaching requires broaches, fixtures and machines designed for efficient production. Because of 30 years' experience, American Broach can engineer and build a tool, or a complete unit, that will do your job best.



*Keyway, spline, involute spline, surface, rotor-kut, serration, combination or burnishing—every type of broach can be engineered and built by American.*

## take broaches for example

*American* makes every type of broach for internal or surface broaching, in a shop modernly equipped for the utmost production economy. They manufacture them to a consistent standard of quality . . . users know the performance to expect from *American* broaches. The exacting production standards of *American* combined with the engineering and manufacturing "know-how" produces precision built broaches, and before release to a customer, each broach is rigidly inspected for guaranteed satisfaction.

As a result of this care in manufacturing, *American* broaches have proven in use that they give maximum serviceable life . . . produce more parts per sharpening . . . can be counted upon for the finest results in production.

Is there, in your plant, an operation where lowered costs and increased production would be an advantage? Send a sample part or print plus hourly requirements for the recommendations of American engineers. Please address inquiries to Department A.

### AN ECONOMY TIP FOR BROACH USERS

Get an extra broach or two with your first order. The cost per broach will be lower and you will avoid unnecessary delay while sharpening.

### WRITE FOR BROACHING BOOKLETS

*We'll be glad to send you descriptive circulars to help answer your broaching questions. Circular 144M covers broaches and contains much valuable information. Circular 700M describes the American line of push and pull heads. Others on American machines may be obtained.*

AMERICAN *American* BROACH & MACHINE CO.

A DIVISION OF SUNDSTRAND MACHINE TOOL CO.

ANN ARBOR, MICHIGAN

**See *American* First—for the Best in Broaching Tools, Broaching Machines, Special Machinery**

Photo courtesy The Astatic Corporation, Conneaut, Ohio

Checking a phonograph precious metal needle cartridge for stylus projection, tip radius and included angle on a Jones & Lamson 14" Pedestal Optical Comparator.

*"We find this the only satisfactory way to check such small parts, as the tip radii range from .0028" to .003". In addition other important dimensions can readily be checked."*

Says The Astatic Corporation, manufacturer of sound reproducing equipment, who use Jones & Lamson Comparators to help maintain the highest standards of operating efficiency for its products.

Many components and products formerly inspected by slow, tedious methods, that retarded production and drained profits, are now inspected in seconds or minutes on Jones & Lamson Comparators, by operators with only a minimum of instruction. Savings are made all along the line, in gage cost, in time and in overhead.

Our engineers are inspection specialists; their knowledge of holding fixtures, handling methods and suitable Comparator equipment has saved hundreds of thousands of dollars throughout the country. Call, write or wire for their services today.

Every owner of a Jones & Lamson Optical Comparator should have this catalog of standard glass screens. Write to Dept. 710 for your copy.

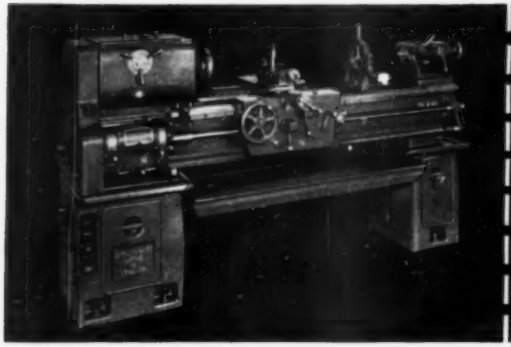
**DID YOU KNOW...**

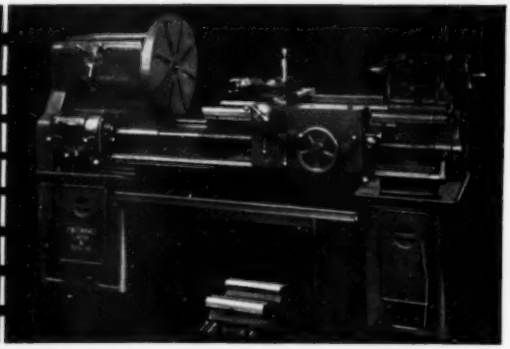
**THAT JONES & LAMSON COMPARATORS ARE USED TO INSPECT PEN POINTS?**

*Optical Comparator Division*

**JONES & LAMSON MACHINE COMPANY**
Springfield, Vermont, U.S.A.

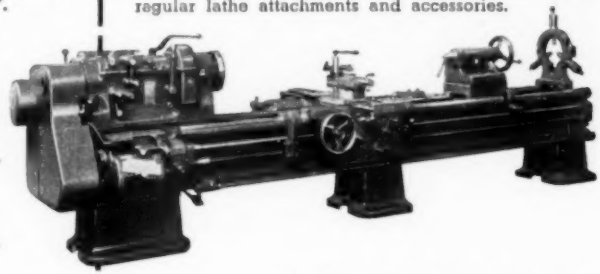
# GET MORE... PAY LESS



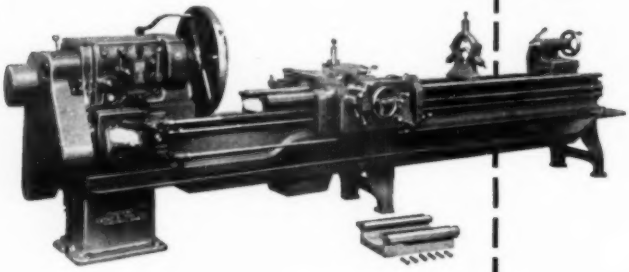


**Lightweight Champ:** The new Tray-Top line of light duty geared head engine lathes (10", 12¼", 15", and 18" swing sizes) offers many "high price" lathe features at truly low cost: 12 spindle speeds, selected by color-coded dial; 48 thread and feed changes; exceptionally large spindles; anti-friction bearings, double-walled apron; totally enclosed quick change gear box; many others. Distance between centers from 18" to 60".

**All This – And Gap, Too:** 15" and 18" Tray-Tops furnished with gap, give you 22" and 25" swings over gap. Carriage has short wings on headstock end for maximum approach of tool; wings on tailstock are extended for maximum rigidity and adequate bearing surface on bed. Like regular Tray-Top, distance between centers from 18" to 60", in increments of 6". All furnished with regular lathe attachments and accessories.



**Middleweight Champ:** In the medium duty class, the Standard line (14", 16", 18" 20", 22", and 24" nominal swings) assures you real all-around utility with exceptionally low initial investment; quickly pays for itself by efficient handling of practically all your turning, boring, and threading operations. 12 spindle speeds; 32 thread and feed changes; distance between centers from 30" to 240".



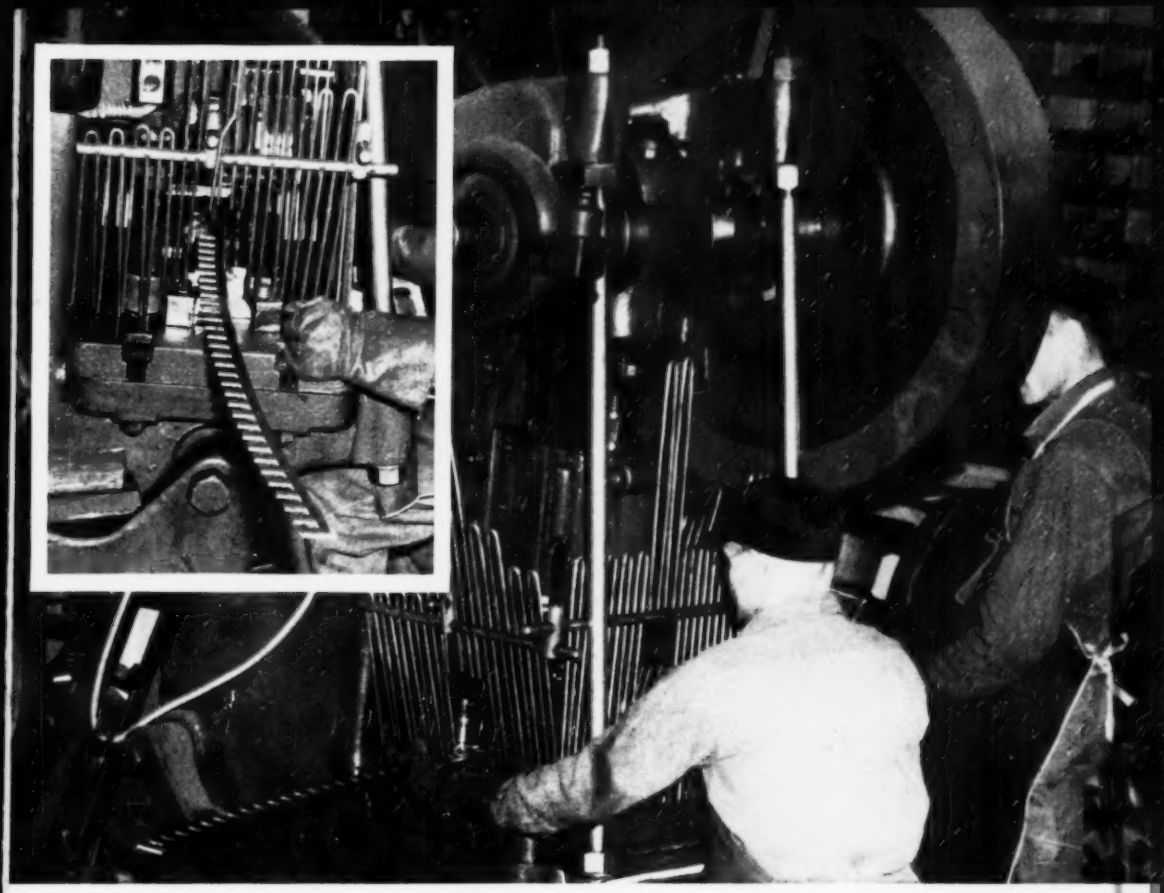
**Gaps In All 6 Sizes – Increase Capacity:** With swings over gap from 24½" to 38½", Standard Fixed Gap Bed Cintilathes give you oversize work capacity where cost of heavy lathe is not justified. Versatility and economy are balanced to your requirements.

***WRITE FOR BULLETINS:*** *T-100 on Tray-Tops; T-101 on Tray-Tops with Gap; S-100 on Standards; S-101 on Standards with Gap.*

***the best buy in its class***

**cintilathe**

## CINCINNATI LATHE & TOOL CO., CINCINNATI 9, OHIO



# Put more life into your punches

AN UNUSUAL METHOD of making ring gears was adopted by the Gibson Manufacturing Company, Oostburg, Wisconsin. The gears are punched from bar stock of mild, hot-rolled steel in thicknesses of 1/4" and 5/16".

The operation, however, posed certain problems. As a die lubricant, a cutting oil containing lard oil was used. Corners of the punch kept chipping out. Regrinding was necessary at fifteen-hour intervals. Rejections ran 15%. Only 200 pieces could be produced between grinds. Various base oils were tried. Each failed to bring the desired improvements.

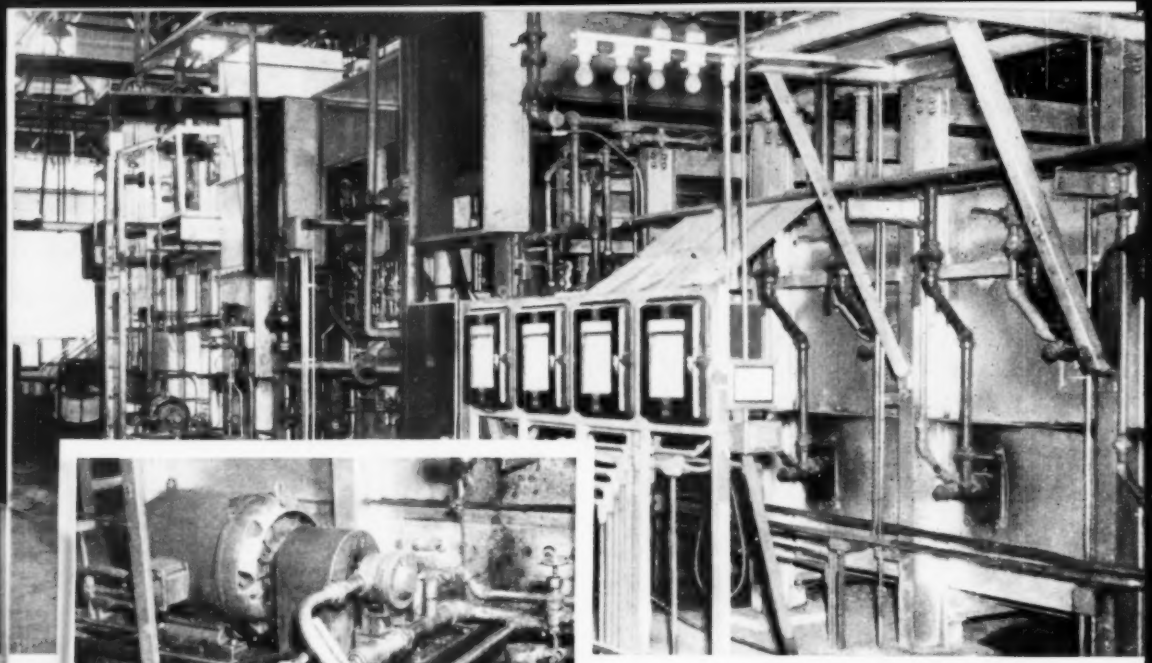
At the suggestion of a Standard Oil Cutting Oil Engineer, the operation was switched to Stanostamp S Compound. Chipping troubles ended. Parts came out cleaner. Rejections ran to only 1%. On top of all this, production between grinds jumped to 450 pieces—an increase of 125%.

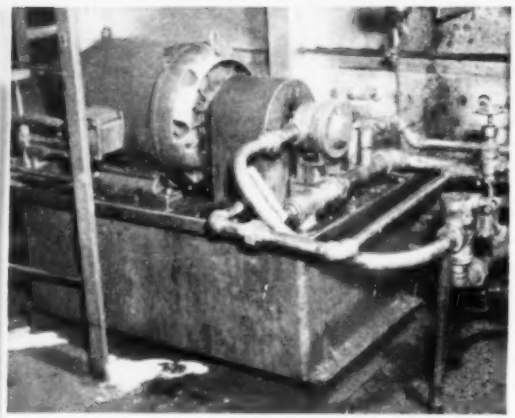
## Stanostamp S Compound

These remarkable benefits are typical of those you can obtain on all types of drawing and stamping operations with Stanostamp Compounds. A Standard Oil Cutting Oil Engineer will help you choose the right grades for your jobs.

If your plant is located in the Midwest, write Standard Oil Company (Indiana), 910 South Michigan Avenue, Chicago 80, Illinois, to secure the services of the Engineer nearest you.

**STANDARD OIL COMPANY (INDIANA)** STANDARD





**STANOIL**
**Industrial Oil**

# How to make your hydraulic operations more reliable

EQUIPMENT like that shown above is used for hardening automotive crankshafts in a midwest plant. Each unit consists of a hardening furnace and an automatic quench tank. Hydraulic units, operating through panel control boxes, move the crankshafts through the furnaces and tanks at prescribed depths and at fixed time cycles.

Because of manufacturing requirements, hydraulic units must operate continuously without shutdown for cleaning. At the same time, they must function perfectly to permit accurate control of furnace operations.

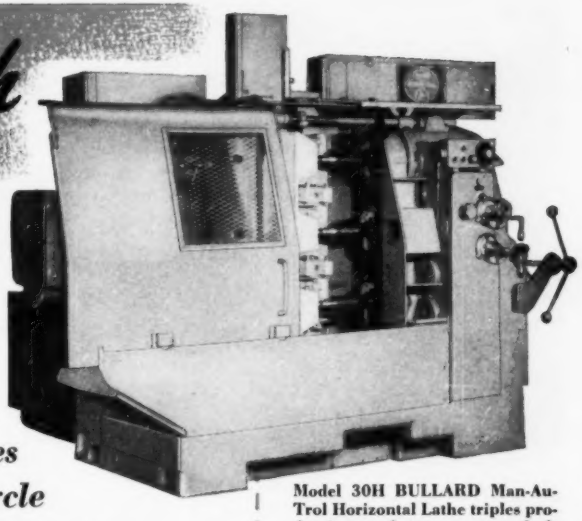
Stanoil 15 has enabled the hydraulic units to meet fully these two stringent demands. There have been no difficulties due to stuck valves. The hydraulic units have responded smoothly and promptly to controls. Oil systems have remained clean and free from deposits.

You can rely on Stanoils to give you the same clean, dependable operation of hydraulic units and of speed reducers and circulating systems as well. These unique, multi-purpose oils can replace many special and costly oils in your plant. A Standard Oil Lubrication Engineer will be glad to help you obtain the most economical use of Stanoil.

If your plant is located in the Midwest, write Standard Oil Company (Indiana), 910 South Michigan Avenue, Chicago 80, Illinois, to secure the services of the Engineer nearest you.

**STANDARD OIL COMPANY (INDIANA)** STANDARD

# It's 3 for 1 with BULLARD MODEL 30H HORIZONTAL LATHE



## *Model 30H Man-Au-Trol Horizontal Lathe Produces 3 Identical Pieces Per Cycle*

**Reports are now coming in from owners of BULLARD Man-Au-Trol Horizontal Lathes proving that this machine's unique "3 for 1" method really pays off in lower production costs. See the accompanying chart for some actual figures.**

**Model 30H BULLARD Man-Au-Trol Horizontal Lathe triples production on between-center shaft turning work by machining 3 finished pieces per cycle with its 3 identically tooled spindles. Simplified tooling for rough and finished cuts also reduces tooling costs. Multiple-tool blocks are provided when needed for grooving, recessing, chamfering, angle-turning and other such operations.**

***These 8 Production Reports May Suggest Big Savings For YOU***

| Number | Part | Material | 3 Pcs. Floor to Floor Time | Time per Piece |
|---|---|---|---|---|
| 1 | Third Motion Shaft | Steel Forging | 2.21 min. | 44 sec. |
| 2 | Inner Axle Shaft | SAE 4140 | 1.c2 min. | 32 sec. |
| 3 | Sector Shaft | SAE 5132 | .8 min. | 15 sec. |
| 4 | Crankshaft | Steel Casting | 2.25 min. | 45 sec. |
| 5 | Overdrive Main Shaft | SAE 4620 | 1.96 min. | 39 sec. |
| 6 | Outer Race Bell | SAE 4620 | 2.0 min. | 40 sec. |
| 7 | Counter Shaft | SAE 4320 | 1st chg. 1.78 min.<br>2nd chg. 1.63 min. | 36 sec.—1st chuck<br>32.6 sec.—2nd chuck |
| 8 | Rear Axle Shaft | SAE 8630H Forge | 2.30 min. | 46 sec. |

### WANT *ALL* THE FACTS?

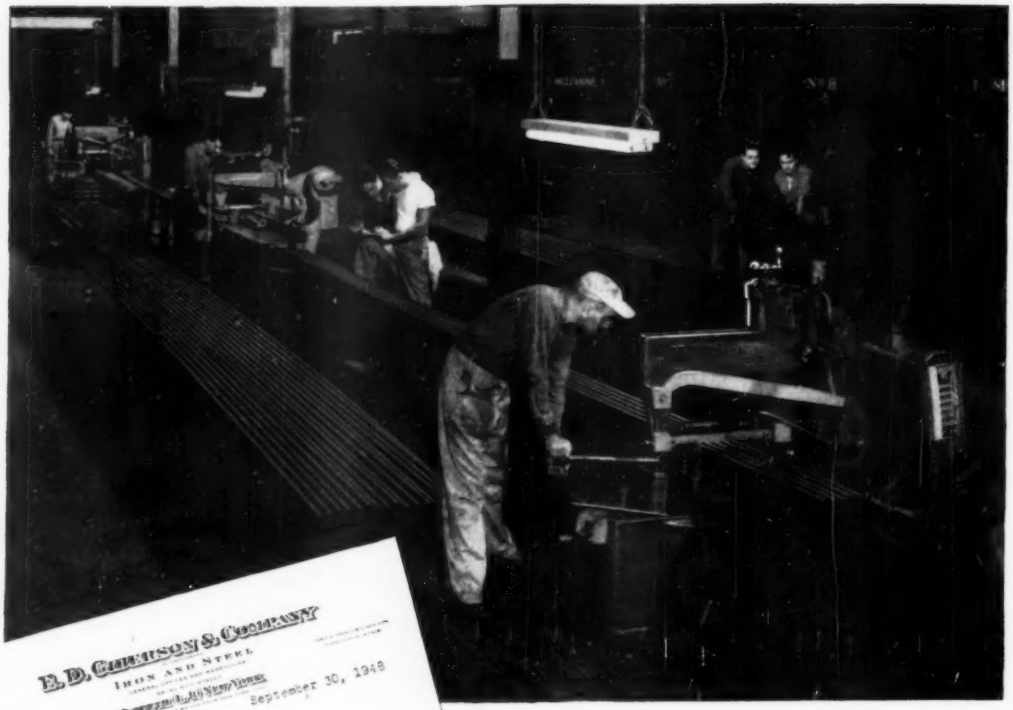
**Here's a Lathe with unique "3 for 1" productivity, right-handed operating convenience, Man-Au-Trol versatility, (manual or automatic operation) and startling performance.**

**In the interest of lower manufacturing costs, make a study of the Model 30H BULLARD Man-Au-Trol Horizontal Lathe. Write today for booklet and time studies on your work. THE BULLARD COMPANY, Bridgeport 2, Connecticut.**

### 16 MM SOUND MOTION PICTURE

**available for Group Showing by writing for scheduling. When writing advise your preferred date.**

## USE BULLARD MACHINES FOR PRODUCTION ECONOMY



E. D. GIBERSON & COMPANY
IRON AND STEEL
NEW YORK

September 30, 1948

Armstrong-Blum Manufacturing Co.,
Chicago, Illinois

Gentlemen:

For almost half a century as direct distributors of Boiler Tubes, Condenser Tubes in seamless steel, electric welded steel and stainless steel, as well as seamless and welded Mechanical Steel Tubing, Seamless Steel Pipe, Stainless Steel Pipe and Tubing, we have put in our warehouse many million feet of Tubular Steel Products.

The nature of our business necessitates both speed and accuracy in multiple cutting to exact lengths required by customers. When we decided recently to install three more 9A MARVEL Heavy Duty Automatic Hack Saw Machines, it was with full knowledge of their efficiency.

We can assure you of our entire satisfaction with their operation and regard them as valuable additions to our equipment.

Yours very truly,

E. D. GIBERSON & COMPANY, INC.

E. D. Giberson
President

## *Another Tubing Warehouse*

# *"Goes* MARVEL"

Warehouses that are not equipped with proper sawing machines find that the cutting of steel tubing (especially the stainless types) is a difficult and costly job. But E. D. Giberson & Company, New York, have cut off millions of feet of all types and sizes of steel tubing to accurate lengths, economically and without difficulty, due to the fact that they have long been properly equipped with MARVEL SAWS. And because they have found MARVEL SAWS so trouble-free, so reliable, so economical to operate and so universally suited to all their cutting-off jobs, they have recently added this row of three new MARVEL No. 9A Automatic Hack Saws. With this additional equipment, they have expanded their facilities and can more promptly serve their fast-growing list of satisfied customers with steel tubing of all types and sizes, "cut to customer's specified lengths."

The local MARVEL Field Engineer will be glad to study your range of cutting-off work—whether it be in pipe, structural shapes, bars, or the thoughest and largest alloy billets—and will then make recommendations on how you can improve your cutting-off operations to reduce costs and increase man-hour output.

Just write us on your letterhead: "Without cost or obligation on our part, send your local Field Engineer to look over our cutting-off operations."

See our CATALOG in SWEET'S FILE

Metal Cutting
MARVEL SAWS
Better Machines—Better Blades

**ARMSTRONG-BLUM MFG. COMPANY**

5700 WEST BLOOMINGDALE AVENUE "The Hack Saw People" CHICAGO 30, ILLINOIS

# Good Reamers + PROPER CARE = lower production costs

• It's simple arithmetic. And it's good business, too. ◈ This PEERLESS High Speed Expansion Reamer is the best you can buy, regardless of price. When it becomes dull it may be expanded and resharpened, not once but many times. The number of times that it may be restored to its original serviceable condition *depends on the care you give it.* ◈ For helpful hints on the proper care and sharpening of expansion reamers, ask our nearest Stockroom to send a Service Representative, or . . .

**Telephone Your Industrial Supply Distributor**

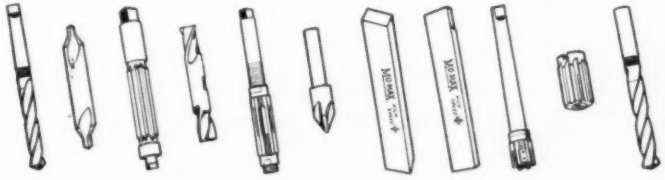
**THE CLEVELAND TWIST DRILL CO.**

**1242 East 49th Street • Cleveland 14, Ohio**

*Stockrooms:* New York 7 • Detroit 2 • Chicago 6 • Dallas 1 • San Francisco 5 • Los Angeles 11

*E. P. Barrus, Ltd., London W. 3, England*

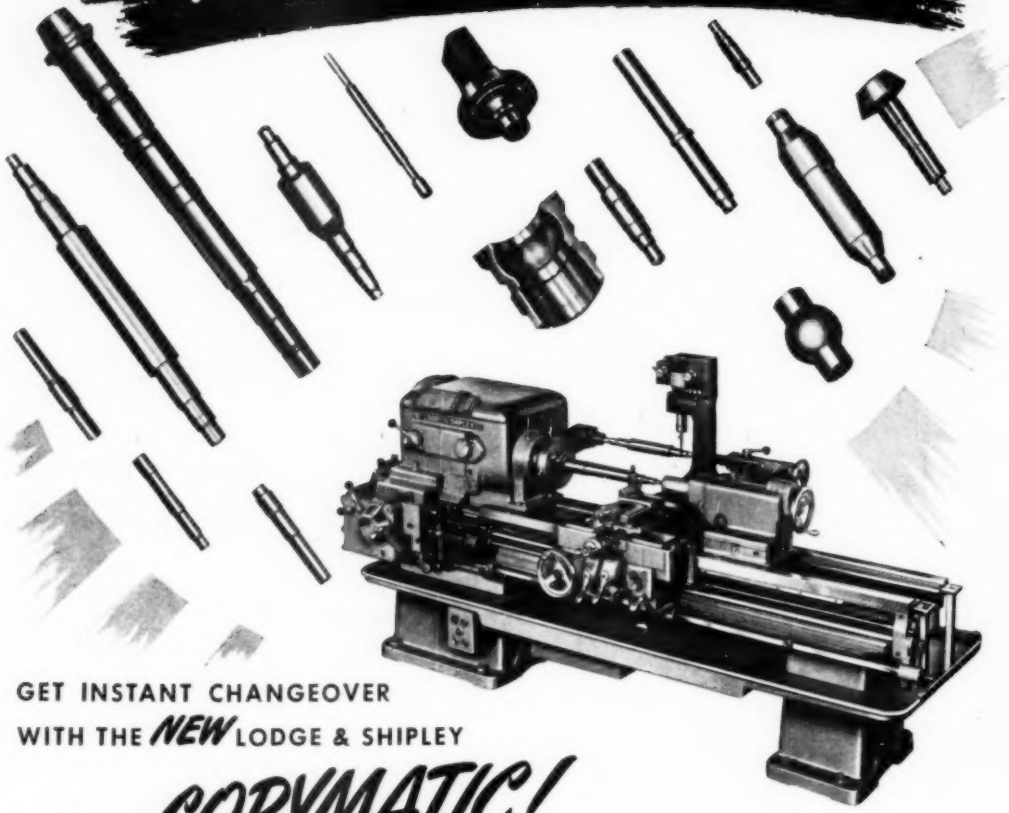
ASK YOUR INDUSTRIAL SUPPLY DISTRIBUTOR FOR THESE AND OTHER *Cleveland* TOOLS



CLEVELAND

DISTRIBUTORS EVERYWHERE are ready to serve you!

# DUPLICATE PARTS LIKE THESE
## ...or do Regular Lathe Work!



**GET INSTANT CHANGEOVER**
**WITH THE *NEW* LODGE & SHIPLEY**

# *COPYMATIC!*

FROM either round or flat templates, duplicating various shapes is quickly accomplished with the new COPYMATIC Lathe. Duplicate to close limits square shoulder faces, grinding necks, tapers in both directions, chamfers and curved contours. Best of all, this latest type Lodge & Shipley "Model X" Lathe is not a special purpose machine; it operates as a regular engine lathe, too.

It takes no time at all to change from automatic tracer controlled duplication to regular lathe operation (or vice versa). There are no complicated adjustments . . . no adding or removing of tricky gadgets. Often, the need for a special template is eliminated. The first piece of a lot can be machined by standard operation, placed in the template holder and used to produce the remainder of the lot automatically.

The speed and convenience of automatic duplication, coupled with proven "Model X" efficiency is an ideal combination for more profitable production. Investigate today. Call your Lodge & Shipley Representative or write direct for Bulletin No. 675.

THE **Lodge & Shipley** COMPANY

MACHINE TOOL DIVISION • 3055 COLERAIN
SPECIAL PRODUCTS DIVISION • 800 EVANS ST.
CINCINNATI 25, OHIO

# NO SOAP!

This designer of power tools had a brain wave .. Why not scoop competition with a featherweight portable electric drill . . . using a cast magnesium housing? But the boss said, "No soap! Too tricky to machine." Undaunted, the designer got in touch with Aluminum Company of America, light metal headquarters . . . He found that simple shop practices make handling magnesium no problem*. . that every month industry successfully uses over a million pounds of this modern metal. He got valuable technical aid, plus books on designing and fabricating magnesium. From then on, it was a cinch to sell his boss on switching to light, strong, easy-to-machine American Magnesium Castings. Now he's the fair-haired boy at the plant since his magnesium hunch put new sales appeal into their whole line.

*No change in insurance rates.

*These two, free books on magnesium and our broad technical experience can help your products, too. Write Aluminum Company of America, sales agent for American Magnesium Products, 2107 Gulf Building, Pittsburgh 19, Pennsylvania.*

MAGNESIUM MAZLO® PRODUCTS

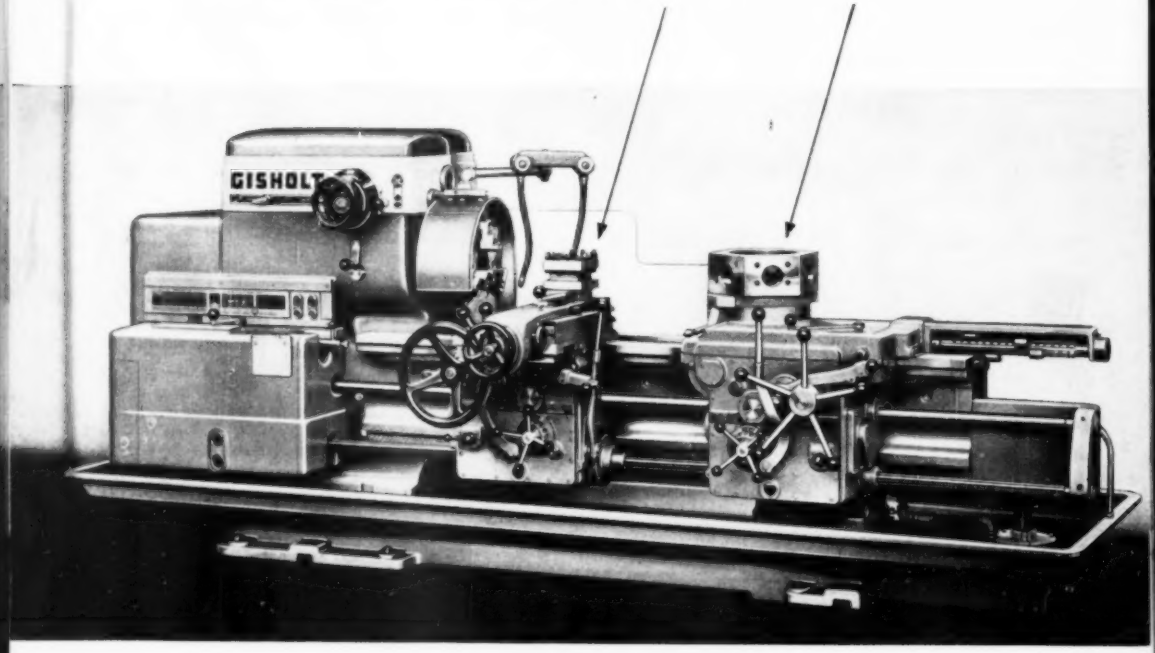
**AMERICAN MAGNESIUM CORPORATION**

**SUBSIDIARY OF ALUMINUM COMPANY OF AMERICA**

# RIGID TURRETS!

## —for Rigid Standards of Accuracy!

It's one of the reasons why seasoned production men insist on Gisholt. The square turret tool post and hexagon turret is locked by double-beveled clamping rings which provide exceptional clamping pressure with easy hand motion. Moreover, on each indexing operation, turret faces are rigidly positioned by hardened and precision-ground locking pins to insure unfailing accuracy.



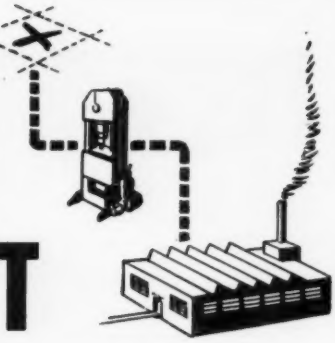

*GISHOLT ACCURACY* is further enhanced by a heavy unit-cast head stock and bed which insures real rigidity. Bedways of hardened steel (64-66 Rockwell C) are ground in perfect alignment with the spindle. And they are virtually wear-proof. If you want accuracy, insist on Gisholt.

GISHOLT MACHINE COMPANY
*Madison 10, Wisconsin*

**THE GISHOLT ROUND TABLE represents the collective experience of specialists in machining, surface-finishing and balancing of round and partly round parts. Your problems are welcomed here.**

**TURRET LATHES • AUTOMATIC LATHES • BALANCERS • SUPERFINISHERS • SPECIAL MACHINES**

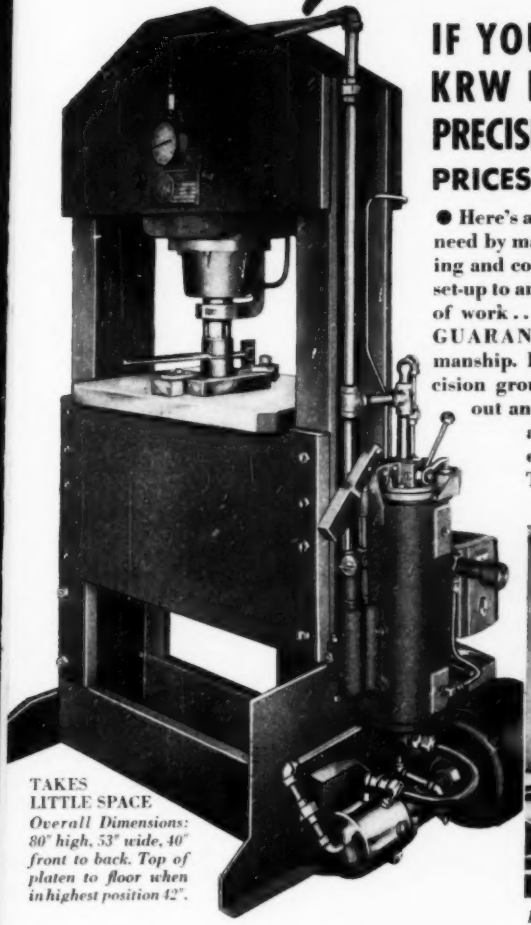
# *There's a* PLACE *for this* PRESS *in Your* PLANT



## IF YOU WORK WITH METAL, THIS NEW KRW FORGING AND FORMING PRESS IS PRECISION-BUILT FOR LONG OR SHORT RUNS

## PRICES* RANGE FROM ONLY $1850 TO $1910!

● **Here's a brand new dual purpose Hydraulic Press that fills a long felt need by many plants. This new 75-ton press can be used on many forming and cold forging or pressing operations. It is easily shifted from one set-up to another; can be used with inexpensive dies to do a wide variety of work . . . relieving heavier equipment for other work. The press is GUARANTEED for ONE YEAR against defects in material or workmanship. Here are some of its features: adjustable bed, platen is precision ground. Equipped with 2-speed built-in hand pump for die try out and delicate pressing. Mechanite Cylinders precision machined and honed to mirror finish. Guided ram to prevent ram swiveling. Get the facts about this latest KRW press development. There's a place in your plant where it can save you money.**



TAKES LITTLE SPACE
*Overall Dimensions: 80" high, 53" wide, 40" front to back. Top of platen to floor when in highest position 42".*

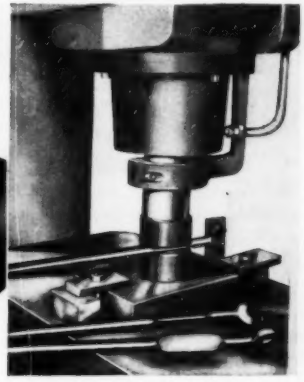


*Illustration shows the press being used to cold form an automotive valve lifter.*

### BRIEF "SPECS"

Standard Model, Series 3700-F, 75-tons.

6" ID Cylinder, 7¼" stroke.

Platen 30"x 18"x 2", adjustable in 4" steps.

Daylight 6" Min. to 18" Max.

Frame Heavy welded steel.

11" stroke cylinder available in air return or double acting types.

Ram Travel Speed varies from 1" per 3.5 seconds to 1" per 2.6 seconds depending upon capacity of hydraulic equipment selected.

*Delivery:* Standard models one week.

* Depending upon capacity and size of hydraulic equipment and motor required. F. O. B. Factory.

**MAIL COUPON TODAY FOR ALL THE FACTS**

**K·R·WILSON**

**215 MAIN ST. · BUFFALO 3, N. Y.**

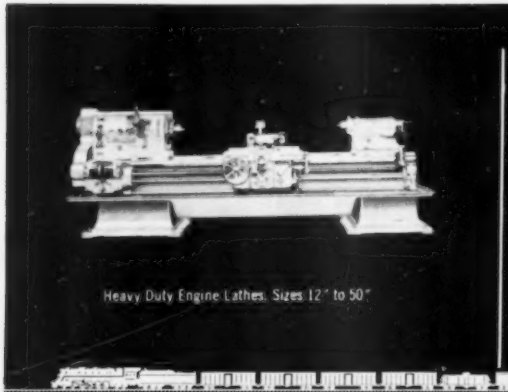
K. R. WILSON, 215 Main St., Buffalo 3, N. Y.

Please quote me prices and information on your new 75-ton Series 3700-F Press.

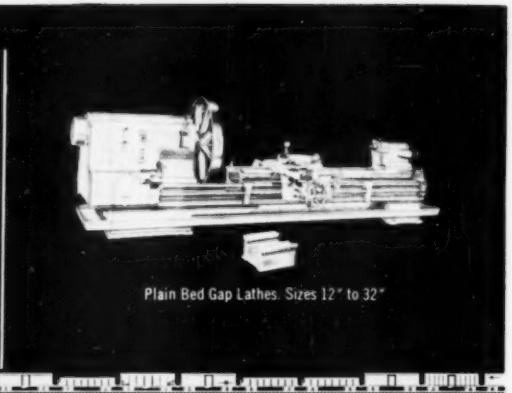
*Name* .....

*Address* .....

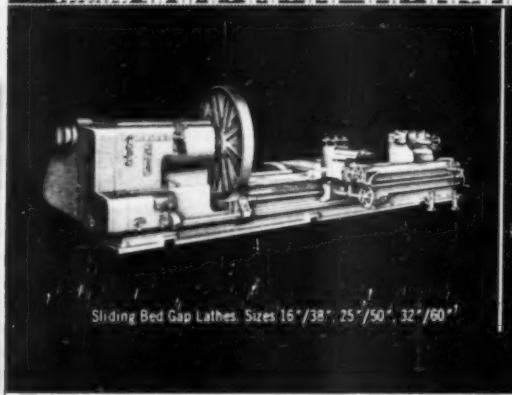
*City and Zone* ..... *State* .....



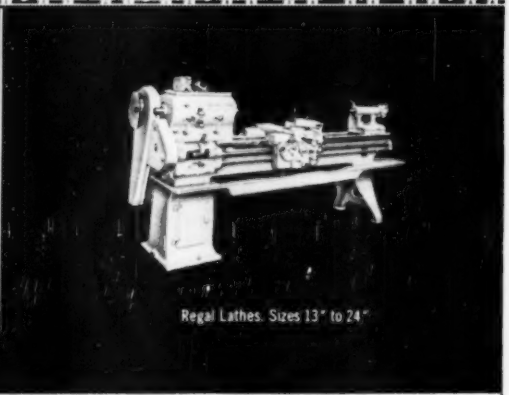
Heavy Duty Engine Lathes. Sizes 12" to 50"



Plain Bed Gap Lathes. Sizes 12" to 32"



Sliding Bed Gap Lathes. Sizes 16"/38", 25"/50", 32"/60"



Regal Lathes. Sizes 13" to 24"

# LeBLOND LATHES

## *keep rolling stock rolling!*

With the LeBlond heavy duty engine and plain or sliding bed gap lathes in the maintenance shop, there are few metal turning jobs you can't tackle with complete success. And adding Regals to the electrical repair shop is a smart move many roads have already made. These four modern LeBlond lathes provide speed and accuracy over a broader range of work. They're smartly engineered and constructed, and are available in a wide variety of sizes to suit your requirements.

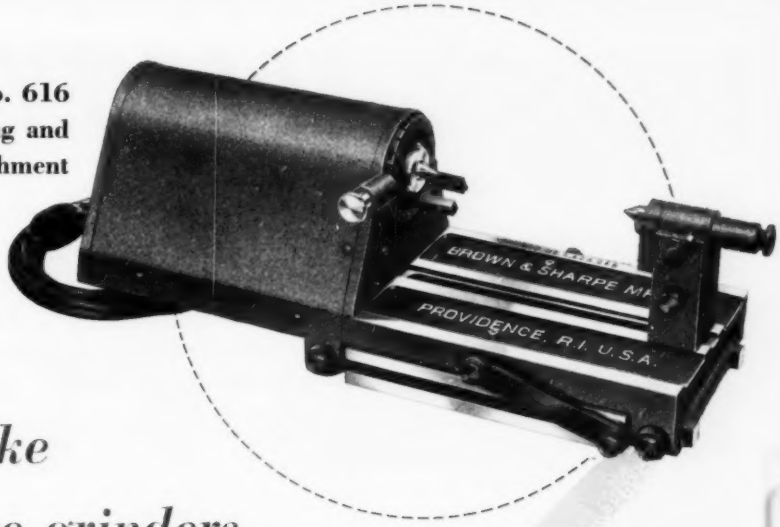
*for complete information*

on this group of LeBlond lathes so widely used by the railroads, see our catalog in Sweet's File for the Mechanical Industries, or write for descriptive bulletins.

LeBLOND

THE R. K. LEBLOND MACHINE TOOL COMPANY, CINCINNATI 8, OHIO
LARGEST MANUFACTURER OF A COMPLETE LINE OF LATHES.
SALES OFFICES: New York, Philadelphia, Chicago, Detroit.

**The Versatile No. 616 Cylindrical Grinding and Indexing Attachment**




# *How to make your surface grinders pay EXTRA dividends...*

You can use your surface grinders for dry grinding small cylindrical work, tapers and work requiring indexing, by equipping them with the Brown & Sharpe No. 616 Attachment. If you have only a limited amount of this work to do, the No. 616 can avoid the addition of another machine and a major expenditure.

On this easily portable attachment, straight cylindrical or tapered work is ground between centers, or if ½" diameter or less, work can be held in indexing spring chuck. Indexing is performed with headstock index plate or with interchangeable indexing spring chuck.

The No. 616 attachment is compact, inexpensive yet precision-built. Motor is totally enclosed. Bearings, permanently sealed. Centers are hardened both in headstock and tailstock. Get complete information on the details and advantages of No. 616 . . . write for Bulletin. Brown & Sharpe Mfg. Co., Providence 1, R. I., U. S. A.

No. 616 Attachment in use on a Brown & Sharpe No. 2L Surface Grinding Machine. Capacity of Attachment: centers swing 6" diameter; take work 5¼" in length. Maximum grinding angle, 45°.

*We urge buying through the Distributor*

BROWN & SHARPE

# SPECIFY

## UNBRAKO SOCKET SCREW PRODUCTS

Reg. U. S. Pat. Off.

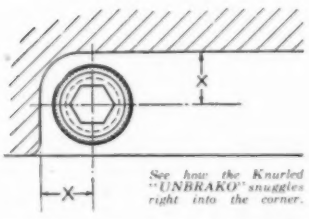
### for compact designs . . . space and weight saving . . . faster assembly

KNURLING (an exclusive "UNBRAKO" feature) on the *head* of the "UNBRAKO" Socket Cap Screw speeds assembly. KNURLING on the *threads* or *points* of our patented "UNBRAKO" Socket Set Screw provides self-locking—"they positively won't shake loose!" In fact, almost any set screw application can be locked with our patented "UNBRAKO." Furthermore, internal wrenching promotes compact design—saves space, weight and material, reduces costs.

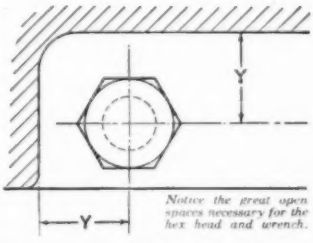
When next you need screw products, remember, "It pays to specify and insist on "UNBRAKO!"

Write for the name and address of your nearest "UNBRAKO" Industrial Distributor and your copy of the "UNBRAKO" Catalog.

Knurling of Socket Screws originated with "Unbrako" in 1934.




*See how the Knurled "UNBRAKO" snuggles right into the corner.*




*Notice the great open spaces necessary for the hex head and wrench.*

*Pat'd and Pats. Pend.*

The "UNBRAKO" Socket Set Screw with Knurled Cup Point positively will not shake loose, regardless of the most chattering vibration.

*Pat'd*

The "UNBRAKO" Self-Locking Socket Set Screw with Knurled Thread for flat, full-dog, half-dog, cone, oval point and for use on hardened shafts. "It won't shake loose!"

"UNBRAKO" Socket Set Screw with Plain Cup Point for use where Self-Locking is not necessary.

*Kits: Pats. Pend.*

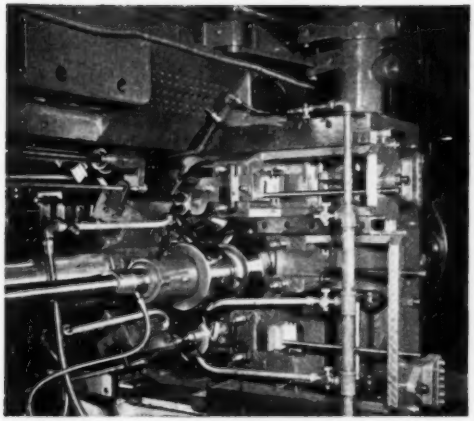
"HALLOWELL" Key Kit. You can't tighten or loosen a socket screw without a hex socket wrench, so why not get our No. 25 and No. 50 Hollow Handle Key Kit which contains almost all hex socket bits.

OVER 46 YEARS IN BUSINESS

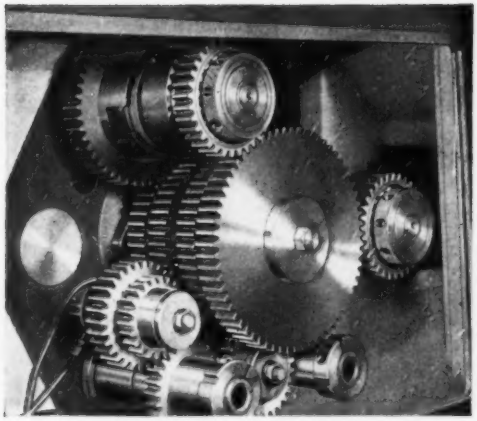
## STANDARD PRESSED STEEL CO.

JENKINTOWN, PENNSYLVANIA, BOX 4

BRANCHES: CHICAGO DETROIT ST. LOUIS SAN FRANCISCO



Full Swing for Main and Auxiliary End Slide Standard and Special Tool Mountings



Cone "Full-Choice" Open End Attachment Drive

# IS HALF A LOAF BETTER THAN ONE ?

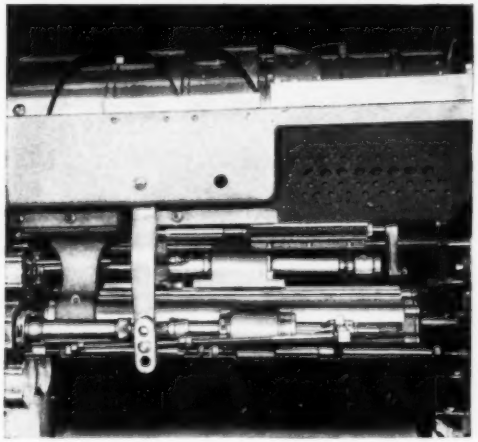
**Machine capacity can usually be measured by tooling accommodation. The facility available to handle the job will determine a machine's dollar value.**

**Lack of a "full choice" accommodation of tooling positions for endworking tools and attachments can be a costly handicap to a multiple spindle automatic. The inability to swing to full collet capacity die heads, hollow mills, trepans, and internal necking tools, can limit a machine's usefulness on many jobs from zero up. Like half a loaf — better than none, but much less than one.**

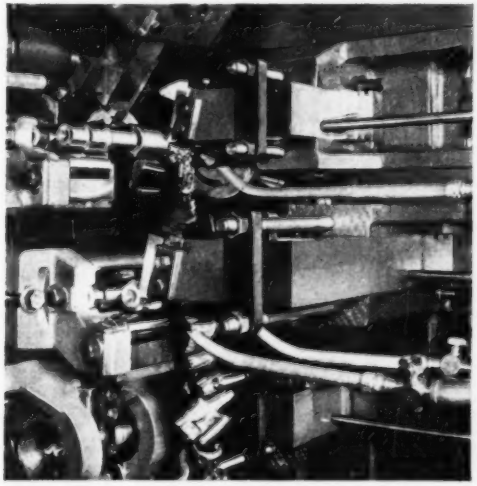
**The "full choice" tooling accommodation of Conomatic cross slides, main end slides, auxiliary end slides and endworking attachment drive positions, are worth checking.**

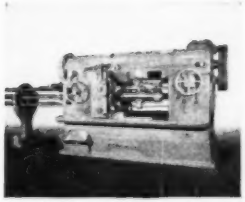
Write to Cone for Buyer's Chart which lists overall requirements of Multiple Spindle Automatics.

"All-Position" End Attachment Mounting



Standard Forming Slide and Auxiliary Cross Slide Facility





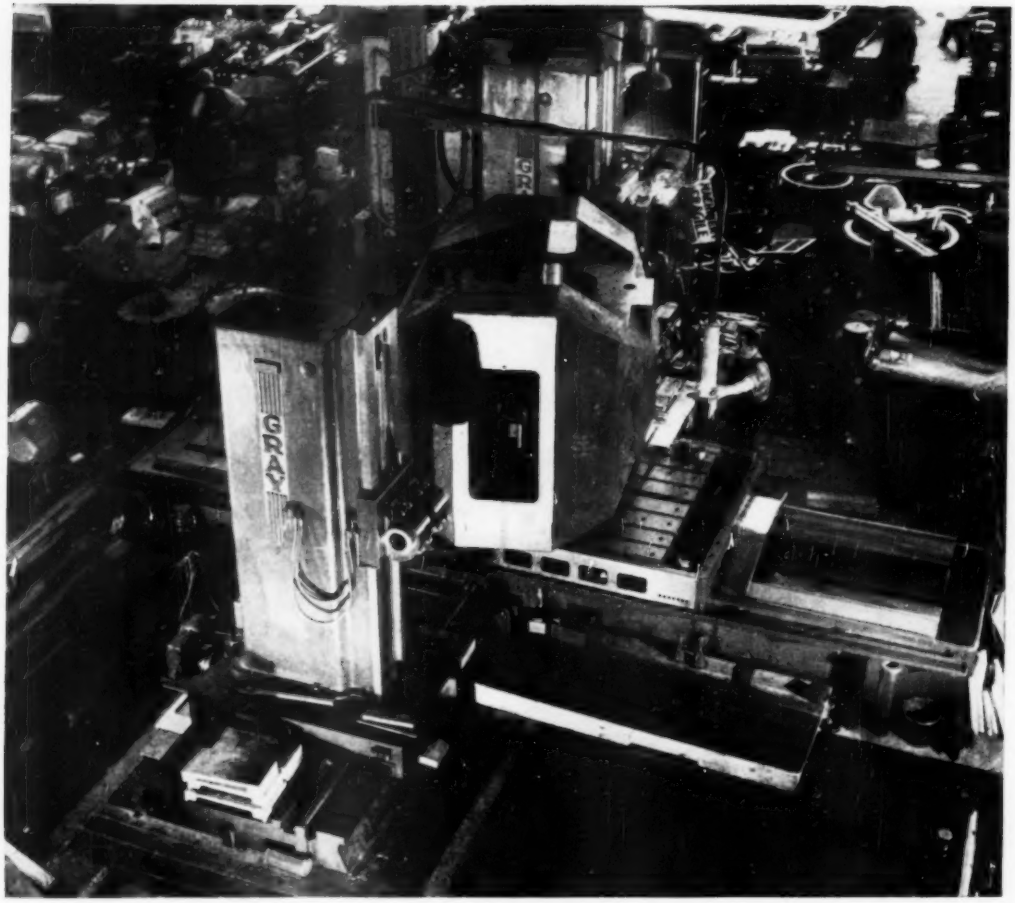
*A comparison with ALL Automatics will lead you to*

#6

**Conomatic**

CONE AUTOMATIC MACHINE COMPANY, INC. WINDSOR, VT., U.S.A.

# Production Records Broken!




THE simplicity and convenience of control that characterizes Gray Horizontal Boring, Drilling and Milling Machines is of special value on large work like this. These powerful, versatile machines are breaking production records throughout the country.

*Write for fully illustrated descriptive Bulletins Nos. 48 & 54*

**The G.A. GRAY Company**

planers • milling planers
planer type milling machines
horizontal boring machines

CINCINNATI 7, OHIO, U. S. A.

SOLD IN CANADA BY UPTON, BRADEEN AND JAMES, LTD. • SOLD IN LATIN AMERICA BY MACHINE AFFILIATES

New Series 52" KING Boring & Turning Machine at The Cincinnati Gear Company, performing three operations simultaneously on a large drive gear casting. Note the excellent finish shown in close-up photo above.

# FASTER PRODUCTION ON "GEARS . . . GOOD GEARS ONLY" WITH THIS VERSATILE *New Series* KING

**THE CINCINNATI GEAR COMPANY**, makers of "Gears . . . Good Gears Only", find their New Series 52" three-head KING a top performer in speeding production of large and medium-sized gears. As many as three machining operations are accomplished simultaneously—as shown in above photos.

Whether the job is large or small, the smooth power, extra rigidity, and all-around versatility of the New Series KING will handle it fast, accurately, at less cost.

Massive construction, a powerful main drive, greater range of feeds and speeds, time-saving ease of control—these and other outstanding advantages in the New Series KING are *your* direct route to stepped up production and profits.

KING Vertical Boring & Turning Machines are made in ten sizes: Single Column—30", 36", and 42" swing; Double Column—52", 62", 72", 84", 100", 120", and 144" swing. All sizes are available with or without side head, in a variety of head combinations. Complete specifications supplied promptly on request.

**American Steel Foundries**

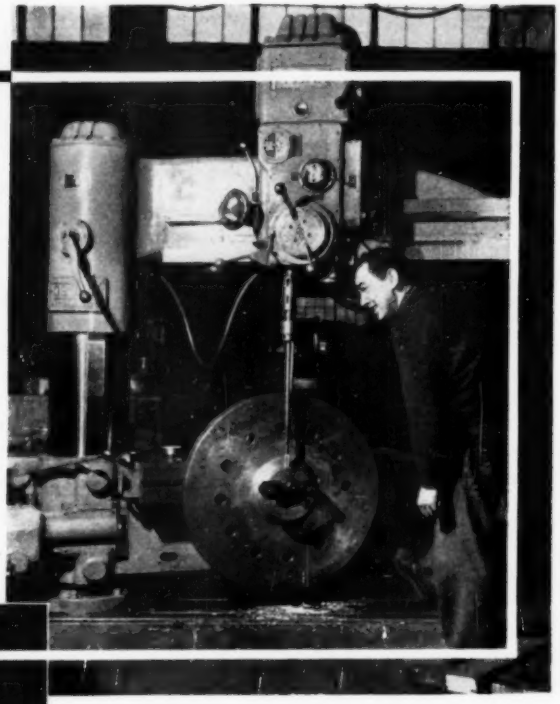
## KING MACHINE TOOL DIVISION

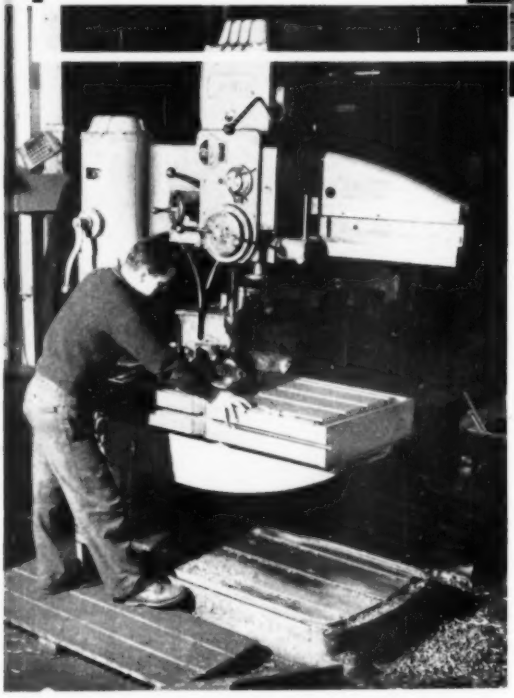
CINCINNATI 29, OHIO

*Builders of King Vertical Boring & Turning Machines and Sebastian Lathes*

# Here's how

**JEFFREY**
**Manufacturing Company's**
**Canadian Plant**
*takes advantage of*
**FOSDICK**
**Sensitive**
**RADIALS**
*Utility*





● The job above illustrates the use of the horizontal slot along the side of the table for holding the large circular casting in position for tapping hole in hub.

The view at the left shows the work being drilled mounted in a jig on the adjustable table.

The two jobs indicate clearly the versatility of the machine for handling a wide variety of sensitive drilling, reaming, tapping and similar operations.

If you are looking for all around utility on your sensitive drilling operations, you should investigate the Fosdick Sensitive Radial.

*For full particulars on the design—construction—and operation of this time and labor saving machine, ask for the new Fosdick Sensitive Radial Bulletin, S.R.A.*

FOSDICK MACHINE TOOL *Company*
CINCINNATI 23, OHIO

# Get Fast Repair

## SAVE TIME, MONEY ON MOTOR, TRANSFORMER & CONTROL SERVICE!

A-2661

EXAMPLE: **Large generator exciter rebuilt in 48 hours — quick service by Consolidated Electric Motor Co., N. Y.**

MACHINE was taken out of service Friday night. Full capacity was needed for Monday morning peak load. Work had to be done quickly and done right. Consolidated worked all week-end and came through on schedule.

That's the kind of service you can get when you need it most from Allis-Chalmers Certified Service Shops in practically every industrial center in the country. Economical for routine service work, too.

Outstanding independent service organizations are selected to be Allis-Chalmers Certified Service Shops. Each meets exacting A-C standards for experience, modern equipment, skilled workmen and reputation for fair dealing. Your nearest A-C Sales Office will give you the name of the Certified Service Shop serving your community.

**ALLIS-CHALMERS MOTORS FOR ALL NEEDS—**

From ½ to 200 hp — call your nearest A-C Authorized Dealer or Certified Service Shop. Larger sizes to 25,000 hp and up, contact nearest A-C Sales Office.

ALLIS-CHALMERS, 999A SO. 70 ST.
MILWAUKEE, WIS.

***Sold . . .***
***Applied . . .***
***Serviced . . .***

**by Allis-Chalmers Authorized Dealers, Certified Service Shops and District Offices throughout the country.**

**MOTORS** — ½ to 25,000 HP and up. Matching Allis-Chalmers Control.

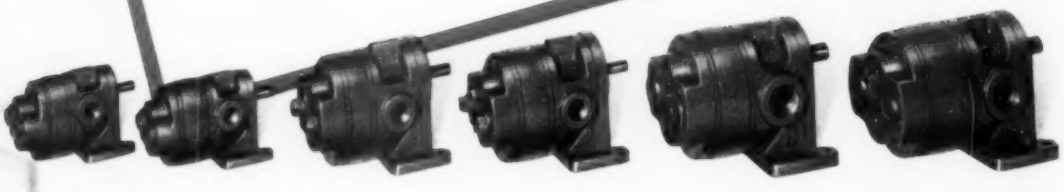
**TEXROPE** — Belts in all sizes and sections, standard and Vari-Pitch sheaves, speed changers.

**PUMPS** — Integral motor and coupled types. Sizes and ratings to 2500 GPM.

*Texrope* and *Vari-Pitch* are Allis-Chalmers trademarks.

# ALLIS-CHALMERS

# Wide range... right selection...



## 500 Series Hydraulic Pumps to fit your needs

Improve the efficiency and dependability of your hydraulic systems by selecting a pump best suited to the specific job.

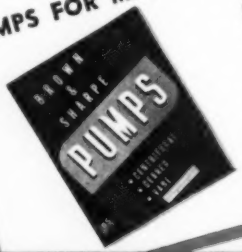
Among the wide variety of pumps offered by Brown & Sharpe for hydraulic systems is the 500 Series. These pumps operate at especially high efficiencies and are long-lived and reliable. Equipped with herringbone gears of heat treated steel, these pumps run quietly at high speeds under pressures up to 500 lbs. p.s.i. Their speed characteristics are designed for direct motor drives.

### OUTSTANDING FEATURES

- 6 sizes. Capacities—5.1 to 37.6 g.p.m. at 0 lbs. pressure at 1140 R.P.M.
- Moving parts balanced hydraulically for end thrust.
- Distinctive design mechanical seal requires no adjustment.
- All surfaces ground to oil-tight fit and held to close tolerances.
- Flange stand available to meet practically every mounting condition. Facilitates assembly of duplex and motor driven units.
- Direction of rotation easily changed.

These and other design and construction features contribute to top performance records established by the Brown & Sharpe 500 Series Pumps. Count on them to help make your hydraulic systems efficient, dependable and economical. Brown & Sharpe Mfg. Co., Providence 1, R. I., U. S. A.

### PUMPS FOR MANY APPLICATIONS




Brown & Sharpe pumps provide reliable means for circulating liquid for coolant purposes, for lubrication and for many other installations in addition to hydraulic. The complete line is shown in the latest pump catalog. Write for a copy.

*We urge buying through the Distributor*

**BROWN & SHARPE PUMPS** B·S

# Van Keuren MEASURING WIRES

## STANDARD EQUIPMENT...

## ...everywhere

Measuring the pitch diameter of a 1"-8 National Form thread gage. This method is recommended by the Bureau of Standards.

**New New New**

**NEW CONCEPTIONS**
**NEW FORMULAS**
**NEW TABLES**

for the exact measurement of multiple worms and screws of unknown profile.

***The Fundamental Fact***

The axis of a wire resting in a thread assumes a position tangent to the helix passed through the center of the wire and not the point of contact.

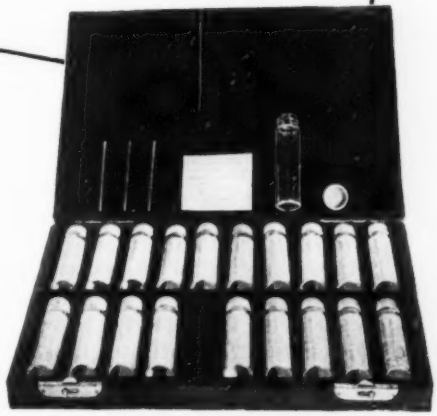
Van Keuren Measuring Wires are the accepted standard equipment for making pitch diameter measurements of taps, thread gages, precision threaded parts, hobs, worms, splines and gears. Reputable manufacturers of ground taps and thread gages used for the production and acceptance of threaded holes and nuts use Van Keuren Measuring Wires. You will seldom find them in error if you, too, have Van Keuren Measuring Wires.

This 208 page volume represents 2 years of research sponsored by the Van Keuren Co.

It presents for the first time in history a simple and exact method of measuring screws and worms with wires.

It tells how to measure gears, splines and involute serrations. It is an accepted reference book for measuring problems and methods.

*Copies free upon request.*



Set No. 20 Thread Measuring Wires is a plant necessity for maintaining taps and thread gages within their limits for wear and for proving the pitch diameter of screws and threaded parts.

Price, High Speed Steel Wires ..... $ 95.00
Price, Carboloy Wires ..... 240.00

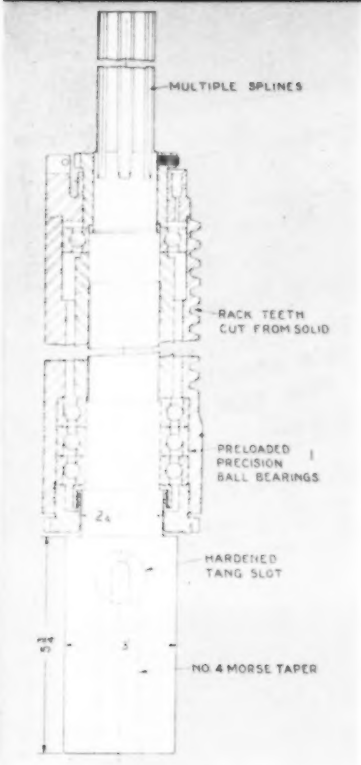
Special wires from .002" to 2.000" diameter are made to any tolerance required.

**THE Van Keuren CO., 173 WALTHAM STREET, WATERTOWN, MASS.**

**30th YEAR**

Light Wave Equipment • Light Wave Micrometers • Gage Blocks • Taper Insert Plug Gages • Wire Type Plug Gages • Measuring Wires • Thread Measuring Wires • Gear Measuring System • Shop Triangles • Carboloy Plug Gages • Carboloy Measuring Wires

# GILBERT *Multi-Duty* RADIAL



## *Displays Modern Spindle Design* FOR STIFFNESS AND ACCURACY

● On most radial drill work, the spindle is extended from the head. The spindle must resist the terrific bending action caused by improperly sharpened drills and the strains of boring applications where depth of cut is uneven in addition to the normal thrust of feeding.

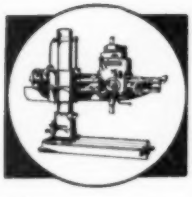
The Gilbert spindle, designed for radial drill work (including the use of multiple spindle heads) gives rigid support against thrust and radial load.

The spindle is fully supported by the bearings in its 4¼" diameter alloy steel quill. The quill has a 12 inch long bearing in the head.

The spindle is mounted in the quill with three ABEC #5 precision preloaded angular contact bearings at the bottom and one bearing at the top. This design guarantees long trouble-free life and accuracy even on extremely heavy duty work.

The spindle nose can be supplied with a #4 or #5 morse taper. The nose is equipped with a replaceable hardened tang slot.

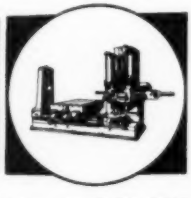
For maximum performance from modern tooling, use a Gilbert Multi-Duty Radial.



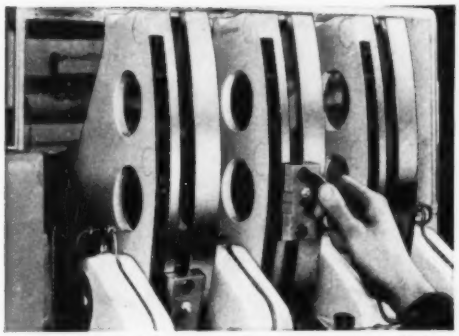
**THE CINCINNATI GILBERT MACHINE TOOL CO.**

3360 BEEKMAN ST. • CINCINNATI 23, OHIO

RADIAL DRILLS . . . HORIZONTAL BORING MILLS



# No cam worries with a Warner & Swasey 5-Spindle Automatic



*Patented "Quick Set" quadrants cut set-up time, quickly adjust to any feed stroke between 0 and 5 inches.*

**NO CAMS TO DESIGN**

**NO CAMS TO MACHINE**

**NO CAMS TO STORE**

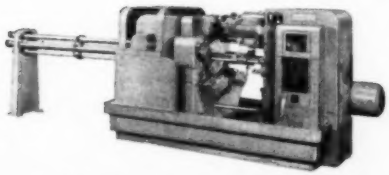
**NO CAMS TO FIND**

**NO CAMS TO CHANGE**

**IT'S SIMPLE TO SET UP**

JUST make a simple setting and there you have your new feed stroke, clearly indicated on a graduated scale. Yes, it's as easy as that! All feed strokes are quickly available for both longitudinal and cross slides. No more need to sacrifice cycle time because the "right" cam is not on hand or because a cam change would take too long. You always get your exact feed stroke quickly on the Warner & Swasey 5-Spindle Automatic.

Full information on these new machine tools will show you how their many new features and design improvements can cut costs, boost production in your shop. Ask your nearest Warner & Swasey office or write Warner & Swasey, Cleveland 3, O.



*5-Spindle Bar Machines*
*—1¼" Standard Capacity*
*—2¼" Oversize Capacity*
*5-Spindle Chucking Machine—6" Swing*

**It's simpler to set up a Warner & Swasey CAMLESS Automatic!**

WARNER & SWASEY
Machine Tools
*Cleveland*

TURRET LATHES, MULTIPLE & SINGLE SPINDLE AUTOMATICS, PRECISION TAPPING AND THREADING MACHINES

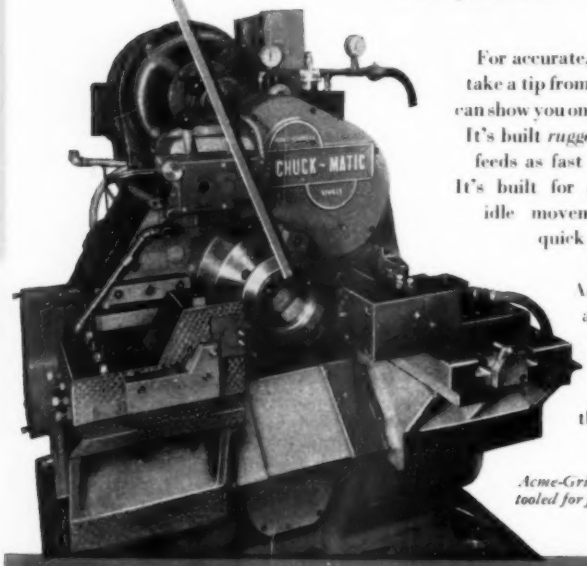
8" Diam. SAE 4620 steel forged rear axle drive gear blank.

1ST OPERATION—Taper face, counterbore and face bottom. Machine Time: 43 seconds.

2ND OPERATION—Face, form angle, rough and finish bore. Machine Time: 60 seconds.

# CHUCK-MATIC PRODUCTION

## Two Operations—1 Min. 43 Sec.—Complete




*Acme-Gridley 12" Single Spindle Chuck-Matic tooled for first operation on rear axle drive gear.*

For accurate, high-speed production of chucking jobs take a tip from this typical case study—one of many we can show you on the new Acme-Gridley 12" Chuck-Matic. It's built *rugged*—and *powerful*—to deliver speeds and feeds as fast as carbide-tipped tools can take it. It's built for *high production*—with a minimum of idle movement and plenty of accessibility for quick setups, easy loading, easy adjustment. It's built *compact*—for space saving. And because it's *easy to operate*, one operator (he needn't be highly skilled, either) can run as many as four machines. That's why we think you'll be interested in the complete details on the Chuck-Matic. Ask for bulletin SC-46.

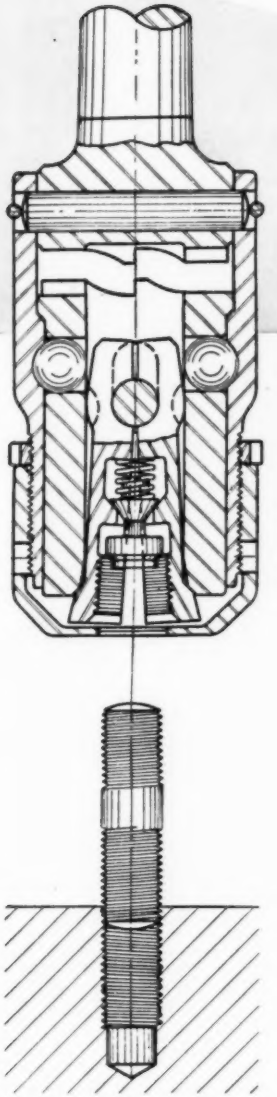
**The NATIONAL ACME CO.**

170 EAST 131st STREET • CLEVELAND 8, OHIO

Acme-Gridley Bar and Chucking Automatics: 1-4-6 and 8 Spindle ● Hydraulic Thread Rolling Machines ● Automatic Threading Dies and Taps ● The Chronalog ● Limit, Motor Starter and Control Station Switches ● Solenoids Centrifuges ● Contract Manufacturing

# SPEED UP
## your stud setting

**Faster, more economically in one continuous operation**



Tool in position over the stud ready to start the drive.

## MODERN SELF-OPENING STUD SETTER

This simple tool does your stud setting job in a single, quick, continuous operation. When the stud is driven to the desired depth, contact between the stop collar and the work releases the clutch, then lifting the tool off the stud automatically disengages the jaws. No reversing. No backing off the stud.

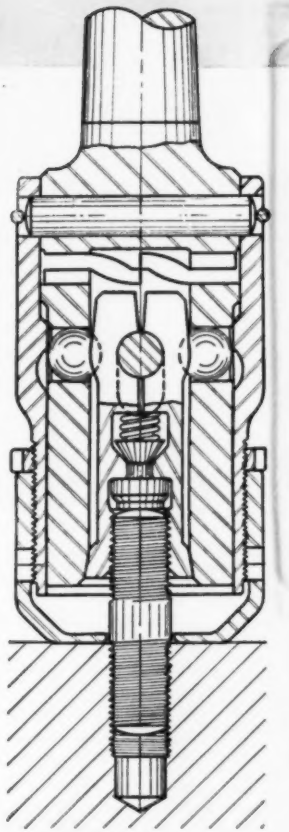
If you have studs to set in quantity, it provides a means to greater production volume at lower operating cost.

The action of the Modern Stud Setter is positive and entirely automatic. It can be operated in any position with either air or electrically operated portable tools. It is equally effective for use in drill presses where it is possible to drill and tap the holes and set the studs in successive operations.

Made in two sizes: ½" and ⅞" capacity.

Many automobile, truck, tractor and diesel engine manufacturers and others having studs to set in quantity rely exclusively on Modern Stud Setters.

*Let Modern Engineers help with your stud setting problems. Full information will be furnished promptly upon request.*



Drive completed. Jaws open automatically releasing the tool.

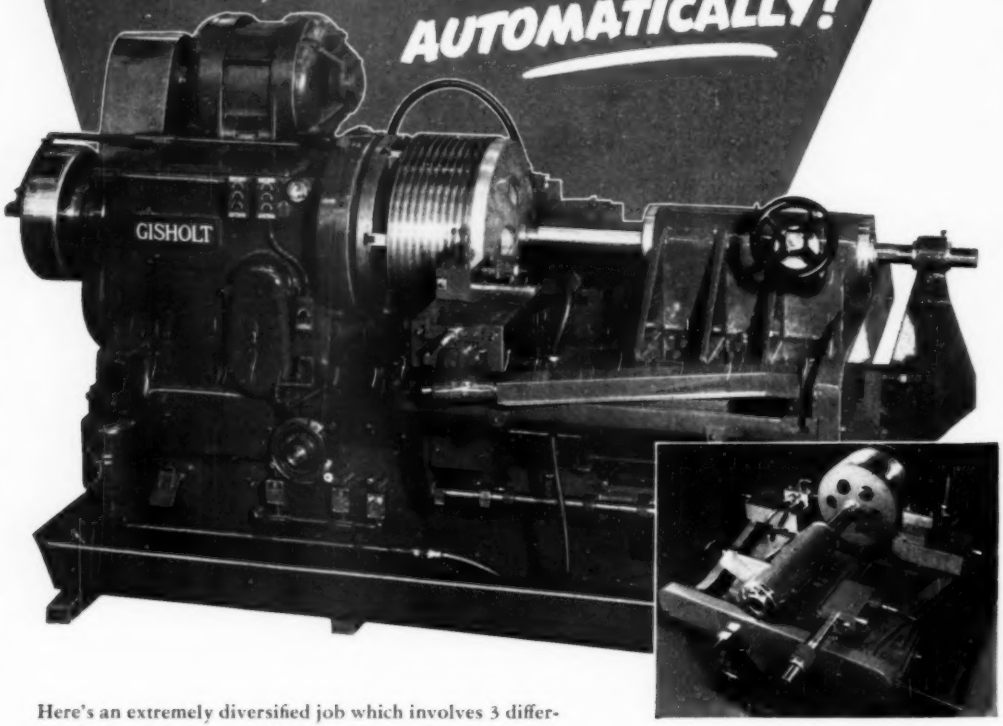
# MODERN TOOL WORKS

DIVISION OF

CONSOLIDATED MACHINE TOOL CORPORATION

ROCHESTER 10, NEW YORK

# How the SIMPLIMATIC machines 212 different multiple V-belt sheaves AUTOMATICALLY!




Here's an extremely diversified job which involves 3 different sheave diameters, 3 different groove sizes—and with from 3 to 10 grooves on each sheave . . . a total of 212 different combinations! Yet the entire job is simplified to *one* machine—the Gisholt SIMPLIMATIC. The SIMPLIMATIC handles them all automatically—with various pick-off gears and face clamps. The grooves are machined progressively one at a time to avoid excessive heat and strains in the workpiece. Total machining time ranges from 2.7 minutes for the smallest to 11.5 minutes for the largest.

It's one more example of the amazing versatility of this automatic machine. Investigate the SIMPLIMATIC before you invest in a special machine.

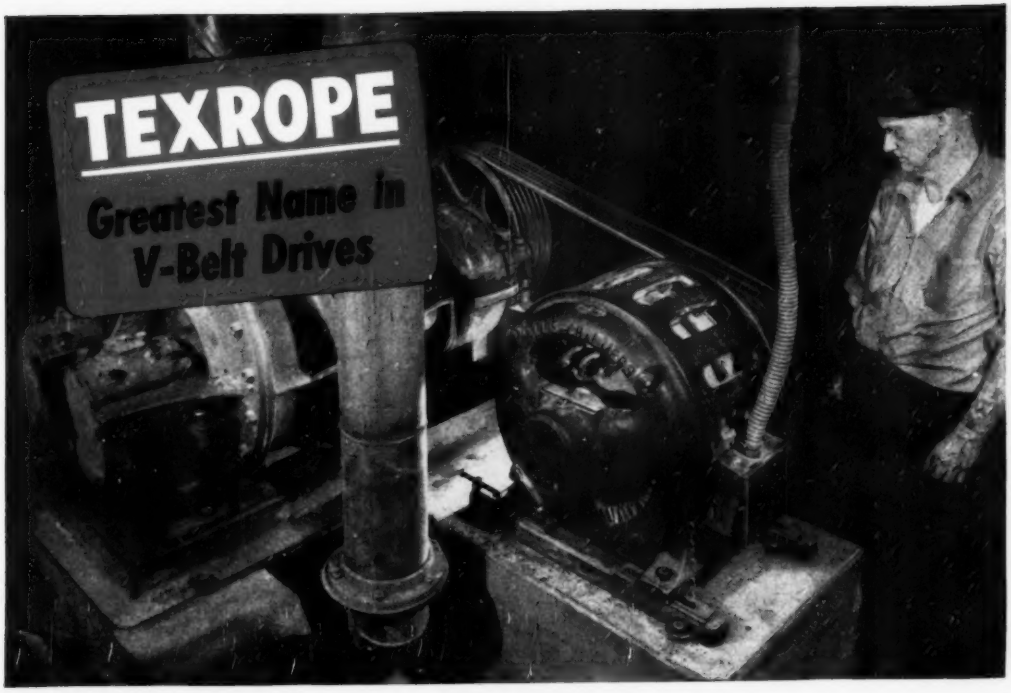
*Automatic pawl fitting into notched bar sets groove position. A single tool bit on the front slide roughs, while the tool bit on the rear slide finish forms. At end of cut, table is automatically repositioned for next groove. Spindle stops and table retracts automatically at end of job.*

**THE GISHOLT ROUND TABLE**
*represents the collective experience of specialists in the machining, surface-finishing and balancing of round and partly round parts. Your problems are welcomed here.*

## GISHOLT MACHINE COMPANY

*Madison 10, Wisconsin*

**TURRET LATHES • AUTOMATIC LATHES • SUPERFINISHERS • BALANCERS • SPECIAL MACHINES**




# "No Upkeep Now"

## BELT SLIP ELIMINATED, BEARING DAMAGE STOPPED, POWER WASTE ENDED WHEN *TEXROPE* V-BELT DRIVE REPLACES FLAT BELT.

CHIEF PLANT ENGINEER in this midwest plant says, "The old flat belt on this blower drive was twelve inches wide on twenty foot centers. Not only was it heavy but it also absorbed a lot of power.

"Besides that, dust made the belt slip constantly. We had to keep the belt so tight that it ruined bearings. And slipping would burn the belt. Maintenance on our old flat belt drive cost us hundreds of dollars every year.

"Four years ago an Allis-Chalmers representative recommended this *Texrope* drive. It doesn't slip at all, doesn't hurt the bearings and we haven't spent a cent on it. I wish we had changed to a *Texrope* drive years sooner."

Money-saving performance like this is one of the reasons why more *Texrope* industrial V-belt drives have been installed since 1926 — when Allis-Chalmers originated the multiple V-belt drive — than any other kind.

The *Texrope* line gives you practically everything you need for any V-belt drive . . . V-belts, standard and *Vari-Pitch* sheaves and speed changers . . . all from one reliable source. You can engineer 90% of all V-belt drives yourself with the help of the *Texrope* Pre-engineered Drive Manual. See your A-C Authorized Dealer or District Office or write for Bulletin 20B6956. Also in Sweet's.

*Texrope* Super-7 V-belts result from the cooperative research of Allis-Chalmers and B. F. Goodrich; and are sold only by A-C dealers and offices. *Texrope* and *Vari-Pitch* are Allis-Chalmers trademarks. A 2648

**Sold . . .**
**Applied . . .**
**Serviced . . .**

by Allis-Chalmers Authorized Dealers, Certified Service Shops and District Offices throughout the country.

**MOTORS** — ½ to 25,000 HP and up. Matching Allis-Chalmers Control.

**TEXROPE** — Belts in all sizes and sections, standard and Vari-Pitch sheaves, speed changers.

**PUMPS** — Integral motor and coupled types. Sizes and ratings to 2500 GPM.

ALLIS-CHALMERS, 999A SO. 70 ST.
MILWAUKEE, WIS.

# ALLIS-CHALMERS

# Economical for 3 operations or 33

**High production of these 2 drilling & tapping machines cuts unit costs to pennies**

Dear Sir:

These machines need expensive tooling. Yet unit costs are amazingly low. The reason is high production.

The oil heater part has 33 operations from 6 directions. Three units at compound angles move forward to operate and then retract so that the fixture can index. Ten identical double fixtures hold 2 parts each. Cost: 1-8/10c per part.

The conn. rod is a steel forging. The milling operation is 42° away from the drilling. The machine grosses 590 parts an hour by 1) holding 2 parts in each fixture and 2) drilling the .125 hole in 2 steps (50.5 FPM). Cost: 9/10c per part.

These costs include man and machine on this basis: National average wage rate. 80% efficiency. Amortize the whole machine cost over its first 6000 hours. (No power or overhead.)

### AN OLD STORY

Such low unit costs are old stuff to many high production men. They figure that certain automatic machines can pay for themselves in 1 to 3 years. That is why they buy them. General purpose equipment can do the operations, but the cost is too high. They can move it to one side and install automatic machines with space left over.

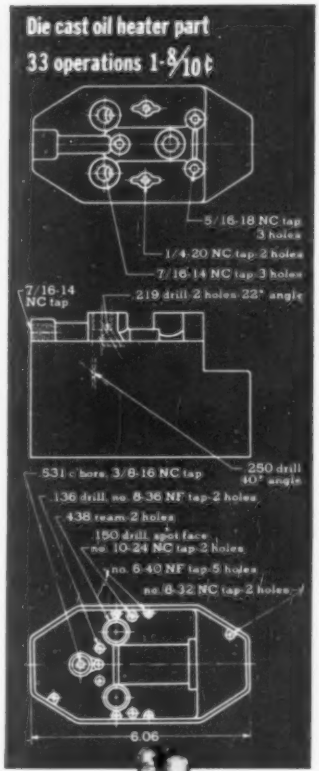
### A NEW STORY

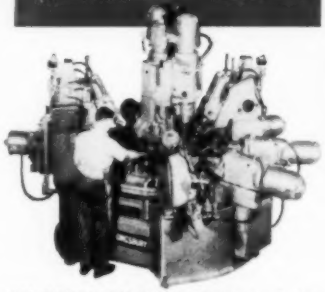
Speaking of installation, here is a remark by one production official. Ten Kingsburys had just arrived. By noon 5 of them were in production. "You know why I like Kingsburys? They run." (He ought to know. Since the war that plant has installed 46 Kingsburys costing $689,204.)

Don't let this bragging scare you. At first most firms ask us to quote only 1 or 2 machines. We will be glad to settle for that. Mr. L. A. Carll is the man to ask. Send him a print showing the operations and hourly output you need. Or ask him for free bulletins showing 40 setups.

Sincerely,

*Kingsbury Machine Tool Corp.*
10 Laurel St., Keene, N. H.


Die cast oil heater part
33 operations 1-8/10¢
5/16-18 NC tap 3 holes
1/4-20 NC tap-2 holes
7/16-14 NC tap-3 holes
7/16-14 NC tap
.219 drill-2 holes-22° angle
.531 c'bore, 3/8-16 NC tap
.250 drill 40° angle
.136 drill, no. 8-36 NF tap-2 holes
.438 ream-2 holes
.150 drill, spot face
no. 10-24 NC tap-2 holes
no. 6-40 NF tap-5 holes
no. 8-32 NC tap-2 holes
6.06

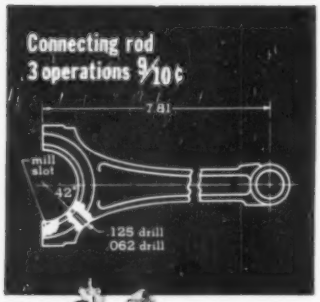


**600 PARTS AN HOUR GROSS.** A 40-inch automatic indexing machine performs operations from 6 directions in 2 chuckings. It has 12 automatic units — 7 on the base, 3 on angular columns and 2 on the central column.

- The horizontal units use multi-spindle heads to operate on the 14 holes in the bottom view (1st chucking) and tap 7/16-14 in the center view (2nd chucking).
- The units on the angular columns operate in 4 steps: 1) The whole unit moves forward by means of an airdraulic cylinder that the feed cam controls: 2) The plate with the tool guide bushing is inserted into the work: 3) The unit performs its automatic cycle: 4) The unit retracts so the fixtures can index. Time: 3.75 secs.
- The vertical units use multi-spindle heads to tap the 8 holes in the top view (2nd chucking).
- Clamping is automatic. In the first chucking an air cylinder at station 1 clamps each fixture. In the 2nd chucking the units clamp the work.
- Control is all-electric and meets the Machine Tool Electrical Standards for Automotive Use. The controls are in a separate NEMA type 1A cabinet that stands near the machine (not shown).

**KINGSBURY**

AUTOMATIC DRILLING
AND TAPPING MACHINES
*for Low-Cost High Production*



**590 PARTS AN HOUR GROSS.** To meet this rate with a steel forging, each fixture holds 2 parts. Each time the table indexes, 2 parts are finished. Two units drill the .125 hole in 2 steps to keep that operation within the allowed cycle.

- The fixtures are automatically clamped and unclamped as the table indexes.
- The milling units are on the radial center line of the machine. The drilling units are 42° left of this line.
- There are 6 identical double fixtures on a 20-inch index table.
- Drilling units with standard milling attachments mill the slot.

# DRILLING LARGE WORK?*

## * Move the machine!

At the American Bridge Company, a U. S. Steel Corporation Subsidiary, drilling many large and cumbersome parts, this CINCINNATI BICKFORD SUPER SERVICE 5' arm 13" diameter column Radial with bailing hook on column, is mounted on a 36" gauge track type base. To speed operations, this machine is equipped with dual controls for traversing and clamping the base. One set is mounted on the base and the other on the head of the machine. For further information, write for Bulletin R-29.

*Equal Efficiency of Every Unit Makes the Balanced Machine*

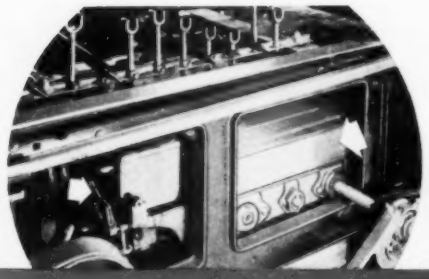
Shipped on five flat cars, the 162' 150 ton span is the largest completely assembled continuous deck girder span ever shipped by the American Bridge Company, and its fabrication was speeded by the use of two track type base Cincinnati Bickford Super Service Radials.

Good judgment in selecting the proper machines, tools, and fixtures will consistently produce the best manufacturing results. Our CUSTOMER PRODUCTION ENGINEERING SERVICE in the metal drilling field represents the collective experience of many years (since 1874). Make your problems ours - - let us show you a profitable Radial or Upright Drill production application. Your most urgent production problems warrant our immediate attention.

THE CINCINNATI BICKFORD TOOL CO.
RADIAL AND UPRIGHT SUPER SERVICE DRILLING MACHINES

Radials 7½" dia. col., 2½' arm, to 26" dia. col., 12' arm.
General purpose Uprights, 21" to 28" sizes.
Production Uprights, 21" to 28".
Jig Borers, Portable Horizontals, Spacing Table Machines.

**THE CINCINNATI BICKFORD TOOL CO.** Cincinnati 9, Ohio



# REEVES Variable Speed Transmission

Above: Accurately controls baking time of bread in direct gas-fired tunnel oven.

Above: Maintains constant tension, reduces stretch of yarn on slasher in textile mill.

Above: Regulates speed of rotary table on welding positioner, for continuous weld.

Left: Provides infinite speed adjustability on lumber planer and matcher.

Above: Varies speed as required in filter processing of synthetic rubber.

## Provides infinite, accurate speed flexibility within 2:1 to 16:1 ratio

Proved in thousands of installations in scores of industries, REEVES Variable Speed Transmission is the original compact and mechanically correct unit which drives production machines at infinitely variable speeds—making available instantly the most efficient speed for each different operation. It covers the entire speed range smoothly, without steps and without interrupting production . . . maintains any desired speed without fluctuation. Available in sizes fractional to 87 hp, both horizontal (illustrated) and vertical types, either open or enclosed designs. Choice of manual (handwheel), electric remote (push button) or entirely automatic controls.

Also in the complete line of REEVES Speed Control equipment are two other basic units—the Motodrive and the Vari-Speed Motor Pulley—likewise offered in the widest selection of designs, sizes, speed ratios and controls.

By providing the right speed for every job, under every changing condition, REEVES Speed Drives are assuring better quality products, higher rates of production and lower manufacturing costs in more than 260,000 widely diversified industrial installations and as standard equipment on more than 2,100 different makes of machines.

A REEVES engineer experienced in your field will be glad to consult with you. For information on the entire REEVES line, write today for the comprehensive 114-page catalog A6-450A.

**REEVES PULLEY COMPANY • COLUMBUS, INDIANA**

*Recognized Leader in the Specialized Field of Speed Control Engineering*

ACCURATE • VARIABLE

*Reeves Speed Control*

GIVES THE RIGHT SPEED FOR EVERY JOB!

# SPOT NEWS OF METALWORKING

**Citroen, French automobile maker, is reported accumulating dollars** to purchase production equipment, including machine tools, in this country. It intends to tool for a new car to be brought out two years from now and will make some changes in current models soon. Buying will be with its own money, not with ECA-financed dollars.

**Air Force will begin transferring funds to Ordnance Department** of Army for guns, ammunition and other items about July 1. Contention between Air Force and Army Ordnance for control of guns, shells, missiles seems to be minimized for present. Ordnance produces all guns for Air Force with its own funds.

**Workers who enlist for not more than three years** in the armed services retain reemployment rights in their jobs, despite the fact that the draft has been suspended temporarily. This ruling has been laid down by the Bureau of Veterans' Reemployment Rights.

**Oerlikon, Swiss machinery firm, appears likely to receive contract** from Indian government to make survey for state-owned machine-tool-building plant and then design and erect the factory, train Indian personnel and start production. Project will cost $30 million.

**CIO Electrical Workers' bid for joint wage drive** got cool reception from Philip Murray's steel union. Latter's wage policy committee will frame fourth-round wage demands in early May, with health insurance up front. Left-wing unions will stress wages instead.

**A beta-ray thickness gage for monitoring thickness of metal foils,** such as aluminum, copper, tin, brass and steel, being rolled at high speed, has been developed by General Electric. Instrument measures amount of beta-rays absorbed by sheet material being checked.

**Entirely new automatic drive for passenger cars** will be introduced next month by prominent car manufacturer. Unit will be somewhat like that used in General Motors buses, a torque converter to accelerate and a positive drive when in high.

**Auto body scheduling is so tight today that traffic jam** which delayed body deliveries recently left one manufacturer's plant with only 15 min. float ahead of the assembly line. Fenders are being painted in 40 min., being finished in correct colors only 2 hr. ahead of assembly line to keep inventory down. This tight timing also reduces chance of damage.

**Many employers and unions will not settle on pension and insurance plans** until they see whether, and how far, Congress liberalizes social security benefits. They also want to find out what kind of deals will be made with leaders such as U.S. Steel and Ford.

**New Chevrolet automatic transmission** will be at company's new Cleveland parts plant instead of at Saginaw, Mich. Cleveland plant now is turning out truck fenders and miscellaneous engine parts.

**$60 million of phantom orders for cutting tools** now being distributed by Washington are going exclusively for high-speed steel tools. Carbide tool orders will be placed later. Phantom orders for gages will be sent out in May, to be followed by orders for industrial furnaces and perhaps fractional horsepower motors.

# Gaging Metalworking

**The nation's metalworking** operations should stay at a reasonably high level, if expenditures for new plant and equipment are an accurate criterion. Heretofore such expenditures and U. S. industrial production, including metalworking, have pretty much paralleled each other.

► Industry in general intends to make an outlay of $18.3 billion this year for new plant and equipment, according to a survey by the Securities and Exchange Commission and the Department of Commerce. These findings confirm the results of the McGraw-Hill survey published in AMERICAN MACHINIST on Jan. 27. The government check, made in February, showed that industry had not altered much its 1949 plans despite the slowdown in business during the winter months.

### Capital Outlays Above '48

Expenditures by manufacturing industries in the first quarter are believed to have been about 12% above the corresponding period last year. Second quarter outlays will be on a par with last year's. But during the last half of the year, estimated expenditures are likely to be as much as 14% below 1948. One should bear in mind, however, that second-half spending in past years has run ahead of estimates; thus the predicted decline may not be so sharp as forecast.

► Some 70% of last year's investment in new plant and equipment went for machinery and other production equipment. Only 30% was for construction.

### Screw Machine Products Sales Decline

New orders for screw machine products have gone down considerably. Shipments too are off, but not nearly as much as sales. Backlogs, as measured in dollars, are reported to be dwindling. Hours worked per week by the screw machine products industry have decreased somewhat. The most disturbing development is the fact that incoming business is at a sufficiently low level for many companies that it now is less than the break-even point.

► Tool and die shops across the country say that there is a dearth of new tooling programs currently.

### Textile Machinery Demand Good

Builders of textile machinery and of paper-making machinery still have a comfortable backlog of orders. But the tightness of a year ago has gone. Delivery dates have shortened and a substantial amount of subcontracting has been ended. At best, subcontracting usually is costly compared with production in one's own plants.

► The defense industries—communications, aircraft, ordnance—are lending a certain degree of strength and stability to metalworking operations, which otherwise might display signs of weakness. No one knows yet what the added demand for military goods will be as a result of the signing of the North Atlantic Pact. But whatever the stimulus, metalworking will be among the first to feel it.

### Machine Tool Sales Spotty

The machine tool industry continues spotty. Some builders are well satisfied with the volume of orders, but others are suffering from hold-ups by customers, who want to see what tax and labor legislation Congress will enact before going ahead.

► There is plenty of business pending. And that fact encourages the industry to believe that an improvement lies ahead. Prospects for purchases by the automobile industry, normally the biggest single source of orders, are brighter than they were a few weeks ago.

A number of machine tool builders are operating 40 hours a week, but others are down to 32 hours. The amount of contract work in builders' plants has shrunk. Some machine tool companies have been acting as subcontractors for makers of textile and woodworking machines, for instance. Because of cancellations and of a general decrease in backlogs, textile and woodworking manufacturers have drawn into their own shops a considerable volume of subcontract work.

### Export Demand Active

Brightest spot in the machine tool situation is export. It has shown a substantial pick-up with many builders. For the industry as a whole, the ratio of foreign to total bookings is back up where it was in 1946—around one-fourth.

► ECA money is sparking much of this business, which is pretty well distributed among a lot of machine tool builders. Orders are coming from various countries: Italy, France, the Netherlands, Norway, Britain. Main trouble is that ECA business is going primarily to builders making equipment of types and sizes not produced in Britain and in other western European nations.

## For Appliance Industry: New Models

What's behind the problem facing appliance makers, who comprise an important segment of metalworking, is clear: how to keep production close to the 1947 level, now that the backlog of war-postponed demand is largely gone.

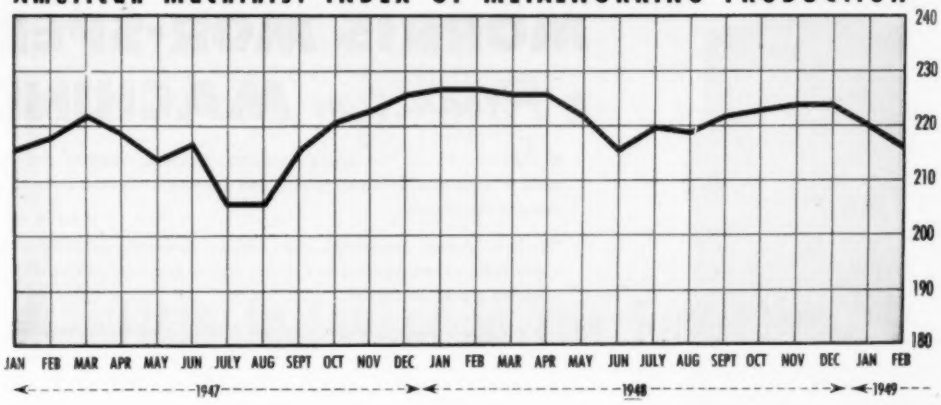
Phenomenal gains in production were registered in a wide variety of consumer durable goods during 1947 compared with 1939, according to the preliminary report on the 1947 Census of Manufactures. Sample: output of household washing machines jumped from 1.5 million units in 1939 to 4 million in '47. Small-size machines, in fact, soared from only 11,000 to 419,000 during that period.

Vacuum cleaner production multiplied almost four times, from about 1 million units in 1939 to slightly under 4 million. The number of domestic electric ranges produced went up from 237,000 to 1.2 million. Almost 4 million household refrigerators and 611,000 home and farm freezers were manufactured in 1947. Some 987,000 electric storage water heaters were turned out, a gain of more than 10 times over the 1939 total.

For some appliances, such as vacuum cleaners, 1947 was the peak year. As customers' needs were filled, production tapered. Others, of which refrigerators are an outstanding example, reached top output last year and only came into a buyer's market recently.

New products and new models, priced at lower levels in many cases, is the best answer to the problem now confronting the appliance industry.

## American Machinist INDEX OF METALWORKING PRODUCTION

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| Jan. 1949 (revised) .. | 221 | 243 | 227 | 229 | 303 | 154 |
| Feb. 1948 ..... | 227 | 250 | 239 | 238 | 289 | 156 |

AMERICAN MACHINIST'S INDEX OF METALWORKING is based on manhours worked in five segments, which are "weighted" as follows: Machinery, 32.5—Auto & Trucks, 22.6—Electrical Manufacturing, 15.4—Transportation Equipment, 12.4—All Other Metalworking, 17.1. Index figures are a percentage of 1939, which equals 100.

U. S. companies making general-purpose machines probably will get little ECA business.

► In the fiscal year beginning April 1, ECA-financed orders for machine tools placed in this country probably will reach the $75-million mark. European customers would like to buy twice that amount if they could get the dollars.

### Steel Situation Eases

Further signs of an easing in the steel situation are apparent. Not that steel is plentiful yet. But special deals, premium prices and conversion sales are going begging these days. That is in sharp contrast with conditions even a few months ago.

► Even in low-carbon sheet and strip, there are current indications of less tension. Warehouse supplies, for one thing, have increased. A few spot offerings of additional mill allocations have turned up. The gray market has about disappeared. On the other hand, there is a continuation of high demand for production of automobiles, railroad equipment, refrigerators and government defense work which insures top production for some time ahead. Recent slackening in general business activity and inventory adjustments by steel users have provided additional sheet and strip, but not to the point at which all conversions can be abandoned.

► A large sheet consumer is warning its manufacturing divisions that it is dangerous to eliminate conversion until all requirements can be covered through regular mill commitments on a safe basis.

### Plate Demand High

Mill plate producers say that they still have more tonnage than they can handle. Improvement is apparent from a general easing in demand, a decline in tonnage allocated to railway car program, and a policy of inventory reductions. These three factors will determine how fast plate conversions will be abandoned. Big users are anticipating increased mill allotments during the third quarter.

Steel bars and shapes appear to be in balance with demand. Customers feel that they are "over the hump" on hot-rolled and cold-finished carbon and alloy bars, alloy sheet and strip, bar-size shapes and structurals, spring steel, wire and nails. Close attention, however, must be given to ordering, scheduling and expediting. A definite buyers' market is not yet at hand.

### Copper Still in Short Supply

Copper is in very short supply during April and May. This condition will continue until production is available, probably in June, from the mine which recently was on strike. Prices remain firm, but recent weakness in copper scrap normally would indicate some price weakness in electrolytic copper. If copper demand holds up to the 1948 level or even drops a bit, and if government stockpiling continues, prices should be fairly stable indefinitely.

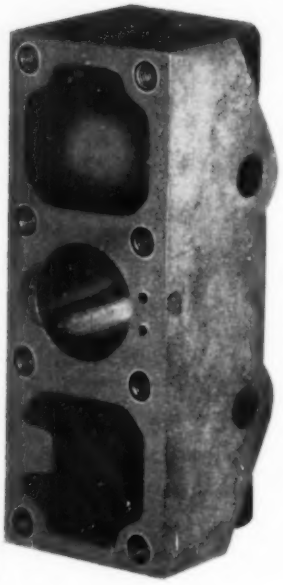
There has been a decline in new orders for copper wire mill products, but as yet operations have not been seriously affected. Deliveries of brass mill products range from stock to four weeks. Some mills are running only four days a week.

Aluminum outlook is better. The improvement arises from betterment of the power situation and some falling off in demand. The decline in orders is from industrial users; the aircraft industry still is requiring large quantities. Industrial customers who had been denied adequate supplies of aluminum are suffiicent to take up any slack.

The lead situation has eased more than that of any other metal. Instead of a tight supply, the position is now easy. Reduction in demand from battery producers is almost entirely responsible for this shift.

One important supplier expects the lead market to stabilize at around 15¢ per lb., New York. If it goes lower, it might force a curtailment of lead production to such an extent that there would not be sufficient lead produced to take care of industrial requirements.

# Here's a sample of the kind of work handled on



# MORRIS MOR-SPEED *Production* MACHINES

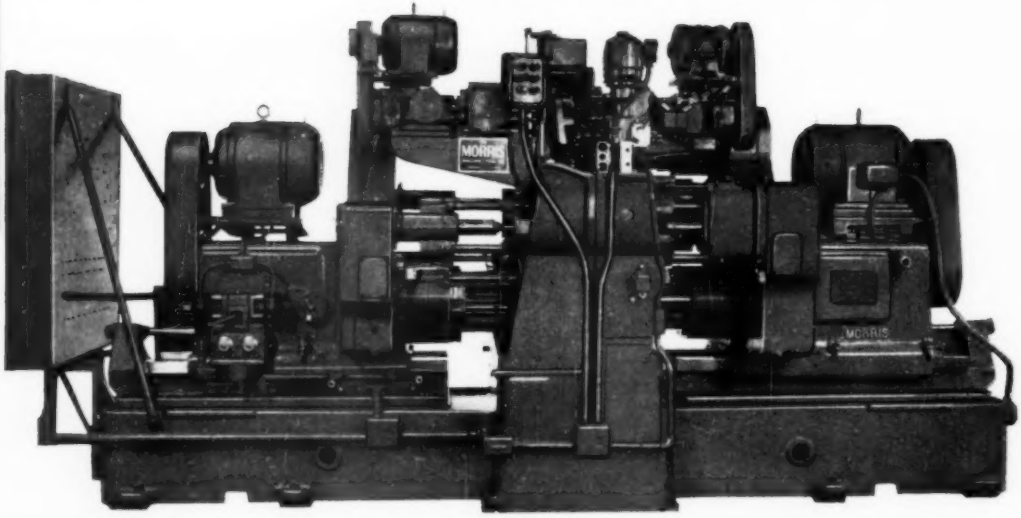
● Here is a Morris Mor-Speed Production Machine designed and developed to meet specific job conditions and produce a finished piece at each index of the machine.

This is a two-way horizontal, eight station, automatic indexing machine which drills, reams, countersinks, forms radius and taps refrigeration unit cylinders shown at the left.

The machine is equipped with nineteen drilling spindles, fourteen countersinking spindles, four counterboring spindles, one reaming spindle and eleven tapping spindles. There are 20 spindles in the left-hand head and 18 in the right-hand head.

If your work calls for numerous operations of this nature on a mass production basis, consult Morris, they have the engineering experience and organization to help you.

The following operations are performed on the work piece shown . . . drill, countersink and tap 8,-¼"-28 tap holes . . . Drill, ream and chamfer both ends of 1⅛" hole . . . counterbore for ⅝" dia. segment . . . drill 2,-13/32 holes . . . counterbore 2⅝" holes . . . drill, countersink and tap 1,-8-32 tap hole . . . drill, countersink and tap 2,-⅜-24 tap holes. Production—150 pieces per hour at 80% efficiency.




Builders of MOR-SPEED Line

The MORRIS Machine Tool Co.

CINCINNATI 3, OHIO

American Machinist

MAGAZINE OF METALWORKING PRODUCTION ★ ESTABLISHED 1877

# Time to Invest in the Future

Too often these days metalworking shop executives realize the cost-saving benefits of new machinery and want to buy it, but are stymied by dollar-conscious top management.

The problem is to sell the financial men—the treasurer, the president, the members of the board of directors.

The task can be made easier if shop executives would invite machinery builders to come into their plants and analyze the cost-saving possibilities there. If that were done, the data turned up would provide convincing evidence that management would be getting a handsome return on its cash investment.

Some alert shop executives already have adopted this procedure, with gratifying results.

To cite a specific case: Sales engineers of a machinery builder were asked to go into a certain metalworking shop and dig up facts about an old machine's performance compared with that of a new.

Here is what the engineers found: The present time to do the work for a year's quantity of pieces is 120,000 min., or 250 days. Proposed time to run the work on the new machine is 35,500 min., or 74 days. That represents a saving of 84,500 min., or 176 days.

Direct savings in labor alone, figured at $65 a week, amount to $2,288. In a year of 200 working days, total savings would be $6,183.

Net cost of the new machine is $15,000. As direct labor savings add up to $6,183 a year, in two years and five months the investment will pay for itself. Disregarded in this calculation are such elements as overtime, power cost, unrecovered capital in the old machine, and reduction in maintenance cost.

Return on invested capital, therefore, is 41% the first year. Where else, might one ask dollar-conscious top management, can you get as satisfactory results with your money?

Other shop executives here and there have done the same thing that the shop executive just mentioned did. They have invited machinery builders to study their production processes and come up with recommendations whereby costs can be lowered.

Results on the whole have been spectacular. In one case, replacement of an old machine with a new would yield a return of 136% the first year. In another case, the return would be 189% (the net cost of the new equipment was $7,000 and the savings in direct labor came to $13,268 per year). In still another case, the return would be 29.7%.

The point is that the kind of analytical work which provides such proof of profit possibilities is invaluable to metalworking shop officials in convincing their own managements that old equipment should be replaced with new.

More shop officials should seek such data and use it in backing up their requests to management for appropriations for new equipment. The facts thus assembled would furnish indisputable evidence that now is the time to invest in the future.

Burnham Finney

EDITOR

# ALL SHEARING BY CINCINNATI . . .

PHOTOS . . .
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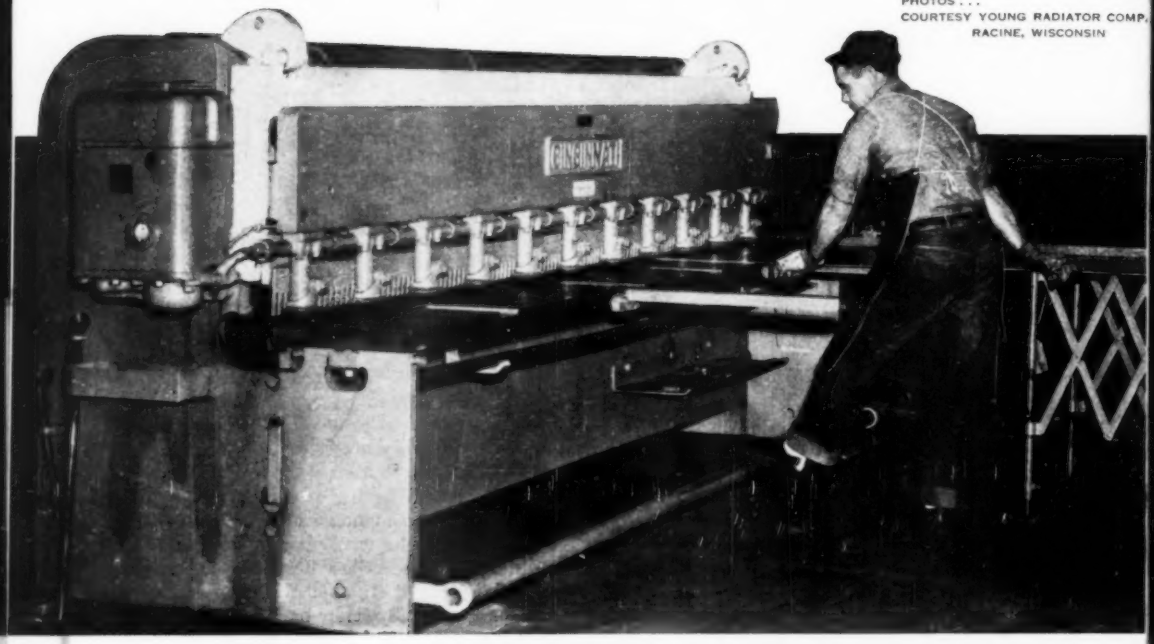

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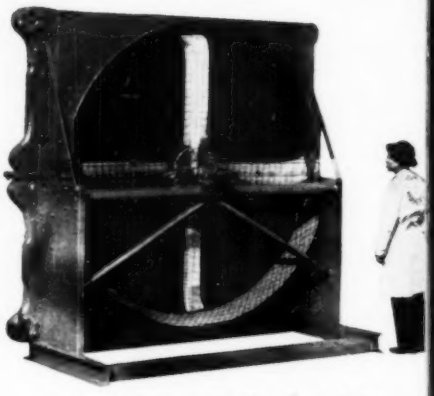

The Young-Happy Full Flow Engine Jacket Water Cooler with 93" variable pitch fan.

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**NOVEL SUGGESTION BOOKLET CATCHES READER'S FANCY . . .**

**Suggestion plan booklet** is designed for high readership. Its three main sections can be seen through windows in the front cover. Inside, pages of varying lengths make these sections easy to locate. Text reads easy and cartoons give light, informal touch

# KEEP SUGGESTIONS COMING

**Suggestion system failings can be cured.**

**Here is what Armco Steel did to overcome its suggestion problems—**

**problems that also exist in many other companies today**

BY ED SCHMID, JR.
Personal Relations Division
ARMCO STEEL CORPORATION

SUGGESTION plans have a way of starting life as vigorous, hustling producers, and, after a few years, losing their vitality and effectiveness. Armco Steel Corporation has experienced this difficulty several times during the 40 years it has operated employee-idea plans.

The company has watched its formal suggestion system start out in high gear, run smoothly for a while, and then, without any change in plan or administration, begin to slow up. There would be a gradual slackening of employee interest, a continually decreasing number of good ideas dropped into the suggestion boxes. When such symptoms appeared, Armco searched for the cause and sought to correct it.

Not long ago, a group of Armco executives met to take an appraising look at the various plans in the company's plants. No two plans were alike, and no two were enjoying the same measure of success. Some were bringing in a high percentage of good ideas, others were doing little better than earning their keep. But even among the energetic performers, problems threatened continued success.

As the group studied the situation, they listed the difficulties the plans were encountering. High on their list were these: Awards were too small to bring out the full power in the collective thinking of the 30,000-plus Armco men and women. Administration was a heavy burden. Payments of awards were slow and frequently not commensurate with the value of the suggestions.

The group examined the plans of other companies, and consulted experts in the field; then it formed a plan of its own. The new plan embodies the fundamentals of modern suggestion systems but has significant deviations from the usual pattern. These eliminate the drawbacks of previous plans, and enable greater benefits from suggestions.

After establishing an adminis-

trative framework for the plan, Armco's committee looked over the list of problems and tackled them one by one.

### Gross Savings Fix Awards

The question "how much" was all-important. The group knew that in recent years the trend had been away from awarding prizes to the "best suggestions" of the month. More and more, plans call for awards to be a percentage of the savings resulting from the use of a suggestion.

These men felt that monthly contests paid awards which varied in size with the suggester's luck. If the suggester turned in a mediocre idea during a month which saw no good ideas entered, the mediocre idea would claim first prize. Yet, the next month might see many unusually valuable ideas entered, and an excellent idea might not even win an honorable mention.

On the other hand, value to the company appeared to be the logical method of determination of awards. So Armco chose 10% of the first year's gross savings as the base for awards. The "gross" means that costs of installation are not deducted from the savings resulting from an idea. Gross savings can be estimated and calculated much more simply and with greater speed than net savings. And if payments were based on net savings, calculations would necessarily be delayed until the suggestion was actually installed and in operation. That often makes for slow payment of awards—one of the problems on Armco's list.

### Payment Is Speedy

The slow payment could be sidestepped by basing awards on estimated savings, rather than on measured savings. The group liked this because of its obvious speed, but frowned at the troubles that could result.

As one man put it, "If we pay on estimated savings, we may not even come close to the actual figure. We can't tell what we will run up against in these days when deliveries, materials, and equipment are uncertain. If the company paid too little to a suggester, we could make it up later. But if the company estimate was too high, we couldn't very well ask for our money back."

And he anticipated another difficutly: "What if someone comes along with a really good suggestion that calls for an award of, say, $2,500. We adopt the suggestion and pay the man his $2,500. The next day another suggestion may come in that eliminates the first one. Then, we would have paid $2,500 based on a year's savings, but would have used the idea only a couple of days."

The solution to the problem brought the desired speed plus accuracy. It was decided to pay awards up to $100 on estimated savings and pay that amount to the suggester immediately. Where an estimated award exceeded that limit, the first $100 would be paid promptly. Then the suggester would receive, at a year's end, a check for 10% of the measured savings less the initial partial payment of $100.

### Management Participates

No small problem facing the group was the question of manpower necessary to operate the suggestion system. Armco wanted its top management to act as an awards committee, not only because deciding "how much" is a rightful prerogative of management, but because this gave the plan more force. Publicity could then truthfully say, "Not only can your ideas win cash—but your good thinking will be brought to the attention of our management."

But top management's day is crammed to overflowing. So, this is the way it was handled:

Awards of less than $100 are decided by a plant awards committee, composed of top *plant* management. Those estimated to exceed $100 are referred to a major awards committee, made up of top *company* management. This committee can delegate to the interplant suggestion co-ordinator responsibility for preparing a list of adopted suggestions plus award recommendations. On intangible suggestions, such as working conditions, his analysis is particularly valuable.

The awards conmmittee can meet and approve his recommendations en masse. The biggest and best ideas can be examined in detail. Some of the smaller awards can be given a "spot check" to see that the co-ordinator's thinking is in line with that of the awards committee.

Having top management's active participation in the plan is all-important, Armco feels. As one

## ATTRACTIVE AWARDS AND SPEEDY REPLIES PLEASE SUGGESTERS . . .

**Award winners are paid quickly.** First check was received by employee at left just seven days after plan was announced. Suggestion of man at right saved an estimated $5,400. He received $100 when the idea was adopted, will get $440 more in a year if actual savings prove the estimate correct

company official pointed out, "Any kind of a suggestion plan will work if it has the full support of management, and if it is intelligently administered. Actually, if management *always* handles suggestions of employees wisely, a company can receive benefits without a formal plan.

"Suppose that an employee of a company which has no suggestion plan makes a suggestion to his supervisor. If the supervisor pats him on the back, compliments him on his good thinking and tells him to keep up the good work, the employee will be back with more ideas—even if he doesn't receive one penny for it. He gets the feeling that he is appreciated—that he has established himself with management as an idea-man—that his company wants his thinking.

"On the other hand, if his suggestion draws only a disinterested grunt from management, the employee's morale and interest fades. A formal suggestion plan is one way of making intelligent handling more certain."

### Intangibles Are Rated

There was a further problem of "how much" that plagued Armco. How can you keep awards for intangible suggestions in line? That is, if you can't calculate or estimate savings, how can you intelligently say that an award represents the actual *value* of the idea to the company?

In the past, Armco plans called for the awards committee to establish these awards "to the best of their ability." The new plan gives the committee a workable guide. The accompanying chart and rating scale shows how it works on adopted safety suggestions.

The chart takes the guesswork out of safety awards. It isn't exact, but it certainly beats the old stab-in-the-dark method. It isn't a completely new scheme, but one that has been tried and tested and has proved its worth.

Other intangible suggestions can be handled along the same lines. For instance, consider ideas that improve working conditions. A rating chart can be devised to serve as a yardstick, because it is possible to make determinations like these: Is it a big or only a slight improvement? Is it an unusual or a common idea? Does it affect many employees, or only those in one department?

Obviously, a suggestion that makes a big improvement is an unusual idea, and affects many employees, should receive a higher award than one that makes a small improvement, is a common idea, and affects only a handful of workers.

### Ideas on Quality Pay

But on some suggestions, calculating the value to the company was a real problem. Ideas that improve quality of product, for example, do not lend themselves to measurement, but are eagerly sought. The group of men rebuilding the Armco plan could find no complete solution anywhere, but they did come up with an angle that works in certain circumstances.

Assume a suggestion calls for minor changes in the design of some machine and these will result in improving product quality: If the changes call for the expenditure of $2,000 for labor and equipment alteration, then the idea is worth at least $2,000 to the company. And 10% of $2,000 is $200. So the award should be at least $200. How much more? Armco hopes that someone will come along with a suggestion that re-

## HOW TO DETERMINE AWARDS FOR SAFETY SUGGESTIONS

| AWARD | DEGREE OF HAZARD | | | ORIGINALITY | | APPLICATION | |
|---|---|---|---|---|---|---|---|
| | Minor | Major | Extreme | Common | Unusual | Local | General |
| $ 5.00 | x | | | x | | x | |
| 5.00 | x | | | | x | x | |
| 5.00 | x | | | x | | | x |
| 7.50 | x | | | | x | | x |
| 5.00 | | x | | x | | x | |
| 7.50 | | x | | | x | x | |
| 7.50 | | x | | x | | | x |
| 10.00 | | x | | | x | | x |
| *15.00-25.00 | | | x | x | | x | |
| *25.00 & up | | | x | | x | x | |
| *20.00-30.00 | | | x | x | | | x |
| *25.00 & up | | | x | | x | | x |

*In evaluating suggestions relative to extreme hazards, the minimum reward should usually be made. The range is provided to take care of outstanding suggestions which deserve additional reward.

Awards are determined from the chart by selecting the figure that corresponds to the decisions made on the following points:

1. ***What "degree of hazard" is eliminated?***
   **Minor** includes defects or lack of safeguards that ordinarily result in accidents causing nondisabling injuries to one person.
   **Major** involves permanent injury to one person or nondisabling injuries to several.
   **Extreme** hazards are those which involve a fatality or permanent injury to several workers.
2. ***Is the idea common or unusual?***
   **Common** are those that would ordinarily be corrected in a reasonable length of time.
   **Unusual** are suggestions that safety men or supervision would not ordinarily produce.
3. ***Is the application local or general?***
   **Local** refers to suggestions that apply to a single condition or the operation of one department.

For example, a suggestion that eliminates minor hazards, is common and applies only locally, is awarded $5. However, if the hazard is extreme, idea common, and has general application, the chart shows an award of $20.

moves all the guesswork—tells them how to figure, "how much more."

On the question of what top limit to set for awards, the men planning the new suggestion system agreed that the value of the award should be determined only by the value of the idea. But they feared that this would not work smoothly in practice.

Some felt that any plan that made possible extremely high awards might result in claims (true or false) that the wrong persons received the award. There could be claims of favoritism, because the incentive would be great. Charges would be difficult to investigate and prove.

Further, they felt that a definite maximum award makes for better publicity. When an employee reads that he can win $2,500 he has something concrete to think and dream about. The $2,500 may even sound *larger* than "no limit."

The only disadvantage was that an idea may be worth more than the maximum. Armco's plan takes care of this. It states: "Even that top award of $2,500 may be increased in exceptionally meritorious cases."

### Patents Are Explained

Another unusual feature about the Armco plan is that it includes a description of the company's patent policy. Patent affairs are delicate, and reducing such practices and policies to writing is often frowned upon, particularly if the writing is circulated widely. But since suggestions are a fertile field for patents, Armco wants suggesters to know what they can expect if their idea is patentable.

This is the way Armco handled the patent angle:

"If suggestions have features that can be patented, they will be given special review. If the invention or device is of use to the company, and is patented by the company, the suggester may be given an additional award. The size of this additional award will be decided, of course, by our management, according to the merits of the invention or device.

"If the company desires only to have 'shop rights,' the company will pay the expense of getting the patent and the patent will be in the inventor's name.

"Even rejected suggestions may have patentable features. In this case, the company will give a written 'release' to the inventor so that he can secure his own patent at his own expense. As always, the company's patent department will be happy to help the inventor in securing his patent."

Armco's new plan also provides that rejected suggestions must be sent in again in one year, if they are to continue to be eligible. In several of the old plans, there was no method of weeding out the old suggestions and files got completely out of hand. Not only did the many filing cabinets require a lot of floor space, but the real trick came in using the files.

One of the first steps, after receiving a suggestion, is to see if it is a duplicate of others already received. That search begins in the files where ideas are listed alphabetically by subject. Sometimes, it will be a long, trying search in files one year old, but wading through ten or twenty years' accumulation was a major headache.

### Pays on Adoption

Another major change the new plan brought was that it pays awards on adoption, rather than on acceptance. By "adoption" is meant: in operation, installed, or actually-planned-with-a-work-order-signed-and-approved.

"We've found that if there is one thing that makes a suggester lose faith in a suggestion plan, it is to waste his idea," an Armco suggestion co-ordinator said. "If he submits a good suggestion, he wants to see it put to use. He gets a bigger bang out of seeing his idea at work than he does out of the award itself. So we pay only on adoption, now."

How is the new plan working? Fine! As expected, when the plan was announced, employees flooded the system with ideas. Many were of little consequence, but many others were of real value. After the first month or so, the insignificant and worthless began to fade away, but the good ideas keep coming.

Fortunately, the first award under the new plan was one upon which actual savings could be calculated. It gave the opportunity for a real demonstration of figuring awards. The award was only a little over $25, but since it was paid in just seven days after the plan was instituted, it furnished proof that the system was speedy.

Right now the system is ringing the bell in improved employee morale and in cost reductions. But Armco doesn't expect that its new plan will last forever, and is ready to make changes in it whenever an improvement presents itself.

From long experience, Armco knows that continuing review and revision is the surest way to cure suggestion system failings.

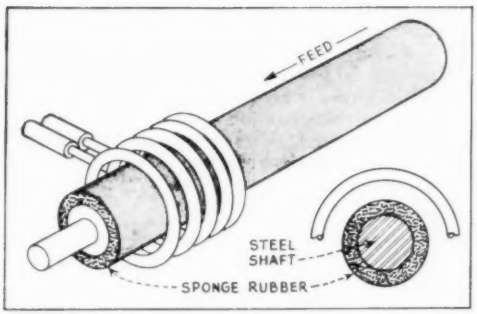
## SUGGESTERS KNOW MANAGEMENT SEES THEIR IDEAS . . .

**Awards committee** is made up of top management. Employees can be sure their ideas will not be wasted and their good thinking will be recognized and rewarded. Suggestion coordinator relieves committee of much detail work

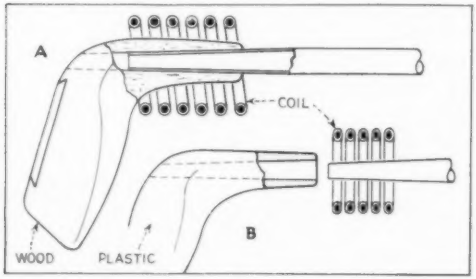
# INDUCTION DOES SOME ODD JOBS

**Drying, bonding, debonding, and sealing are among the unusual operations handled by induction, which heats rapidly, locally, and inexpensively in these cases**

BY FRANK W. CURTIS

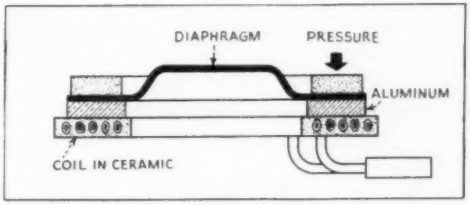



**Removing Rubber . .** To take the rubber coating off steel printing rolls, they are fed through a loosely coupled multi-turn coil at 24 ipm. About 500 F is created, which breaks the bond so the sleeve can be stripped by hand. Magnetic flux from the coil goes through the rubber as if it were air, so no losses occur, in contrast to conduction heating. Reversing the process and heating to 350 F will set up the adhesive on new rolls

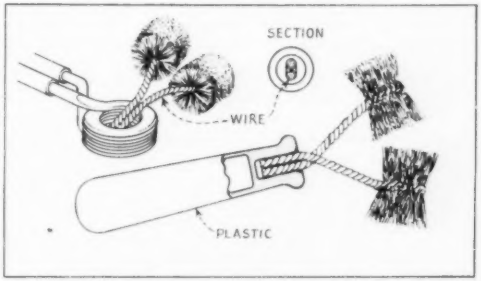



**Bonding Golf Club Heads . .** Wood heads for clubs are bonded to metal shafts by adhesives such as Pliobond, which requires 250 F for curing or setting. Oven heating involves unnecessary bulk and heat. Inserting head and shaft in a coil, as at *A*, causes the shaft end to heat, which in turn heats the wood, so the adhesive sets up in less than 1 min.

Plastic-molded heads, as at *B*, are similarly assembled, except here the shaft is heated to 800 F in 2 sec, then an automatically controlled air cylinder forces the heated end into the head, causing the plastic to seal the bond. A hinged coil, rather than a multi-turn, will speed loading and unloading in either case

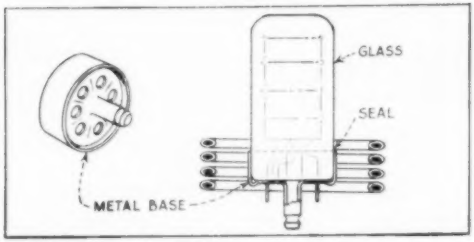



**Rubber to Metal . .** Abutting surfaces of an aluminum washer and a rubber diaphragm are coated with a plastic adhesive such as Pliobond, allowed to air-dry for a minute or two (until the adhesive is tacky) then placed over a pancake coil embedded in ceramic and held firmly together. The metal part heats in a second or two to about 275 F and cures the adhesive. Porcelain cement, asbestos or mica insulation can be used for the ceramic—as long as it forms a hard, flat, non-conducting surface

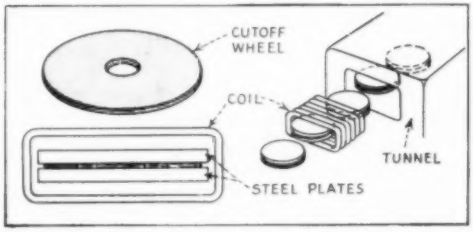



**Plastic-handled Brushes . .** Ends of twisted-wire brushes, usually spotwelded together, are inserted in a continuously energized coil, to heat to 700-800 F. in about 1 sec. Heated ends are then hand-pressed into a plastic handle, causing the hole surface to flow and form a permanent bond. The hole is slightly smaller in area than the wire to assure proper fusion

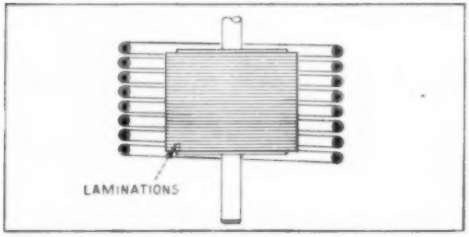
## Induction Does Some Odd Jobs *continued*



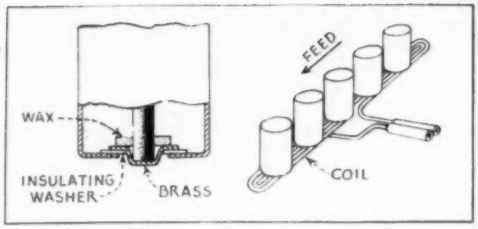

**Salvage of Tube Bases . .** Debasing rejected glass radio tubes to salvage the metal base is done unusually well by induction heat, because the rapid temperature rise (500 F in 1 sec) expands the metal base so rapidly that it breaks away from the bonded joint before heat can be conducted to the glass envelope. Here the heating coil only is shown; the actual fixture includes an automatic indexing plunger which hits the base pins and so knocks off the glass



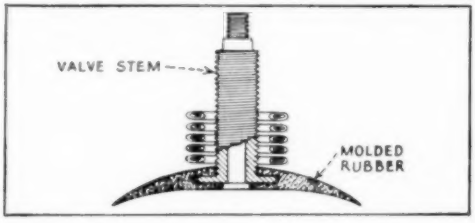

**Curing Cutoff Wheels . .** Two steel disks cover a pre-cured resin-bonded cutoff wheel, and this "sandwich" is fed through a coil in which it is heated to 375 to 400 F in about 30 sec. The sandwich moves on through an insulated tunnel, which holds a fairly uniform temperature for the 5 min needed to complete the cure. This avoids the need for holding the heated wheel in a press, as is normally done, and does not tie up expensive equipment



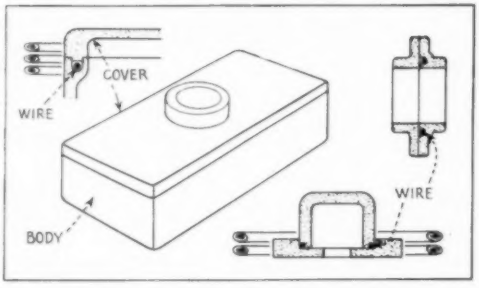

**Oxiding Laminations . .** To develop an oxide between laminations, thus increasing electrical resistance in a 3-in. dia rotor, a multi-turn coil brings the rotor to 950 F in about 1 min



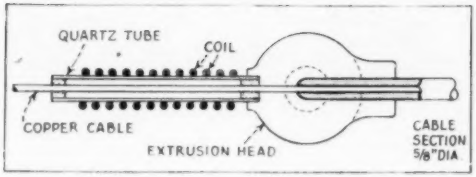

**Sealing Batteries . .** To flow the sealing wax between brass tip, insulating washer and metal case in flashlight batteries, a long pancake coil heats batteries progressively to 190 F in 7 to 8 sec. A wax washer is placed over the central carbon and under the tip, and batteries are inverted and placed on copper-washer shields (to prevent excessive heating of the case). They are fed over the coil at a rate of 90 to 100 pieces per min



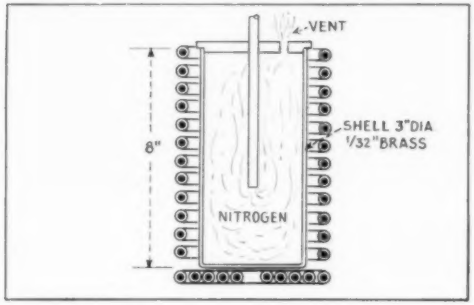

**Debonding Tire Valves . .** To salvage brass valve stems from scrap auto tires, a closely coupled multi-turn coil surrounds the stem close to the bond. The stem is heated to 600 or 700 F in 5 to 6 sec. A series coil handles two stems at once



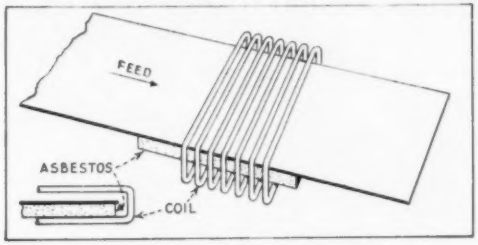

**Bonding Plastic Assemblies . .** If a wire or ring insert can be placed at the joint, induction heat will cause plastics such as polystyrene and polyethylene to flow to form a bond. The plastic box and cover are bonded in 3 sec through the 1/32-in. steel wire shown at upper left. At lower right is a joint made with a 1/16-in. preformed ring, heated rapidly to 400 F while the assembly is pressed together. At upper right is a third example, in which wire is the heated element. In such cases, wire ends should overlap slightly to form a continuous path



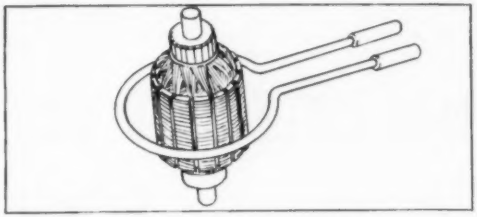

**Cable Covering . .** Induction heat brings copper cable up to the temperature of the plastic covering which is extrusion-molded around it. This heat equalization, at about 350 F, provides a stressproof cable, as required for marine use. The 3/16-in. dia stranded copper is fed at 10 ipm through a quartz tube around which is mounted a multi-turn coil




**Tinning a Shell . .** Electro-deposited tin must be flowed over the inside surface of a 3-in. dia by 8-in. brass shell 1/32 in. thick. Specifications call for a homogeneous surface, free of porosity and oxidation, so a nitrogen atmosphere is applied during heating. The shell is sealed with an asbestos-board cap, through which a ¼-in. tube feeds nitrogen at 2-lb pressure. Gas vents through a ½-in. vent hole. The coil is a combination pancake and outside cylindrical type, closely coupled. The shell is heated to 600 F in 40 sec with a 20-kw output generator




**Drying Lacquer . .** Steel sheets which have been coated with lacquer or lithographic ink are fed through a multi-turn coil at 10 ips and heated to 275 F for drying. The sheet rides on a transite or asbestos plate within the coil to keep it at the coil center



**Drying Insulation . .** Insulating varnish on small-rotor windings can be dried by induction. In this case a loosely coupled single-turn coil heats a 1¼-in. dia. winding to 300 F in 5 sec. A few minutes of cooling completes the drying

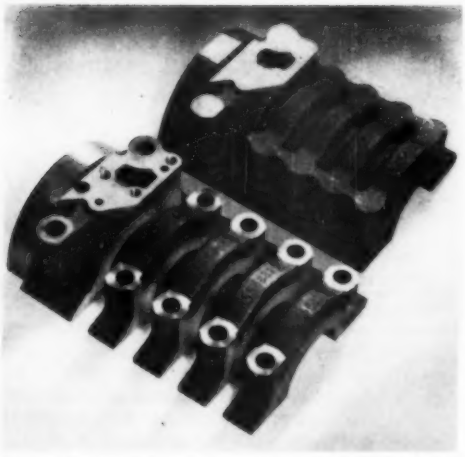
## WETTING ACTION...A CONTRIBUTOR TO METALWORKING

To WET, says Webster, is to "fill, soak, or moisten with water or other liquid," and that process is important in metalworking. Cutting action must be wetted with a cutting fluid—the fluid must wet the work to carry away the heat, and it must wet the tool to provide lubrication. Drawing compounds, often applied unevenly with a swab or brush, must wet the metal's surface so they can spread evenly to provide uniform and adequate protection.

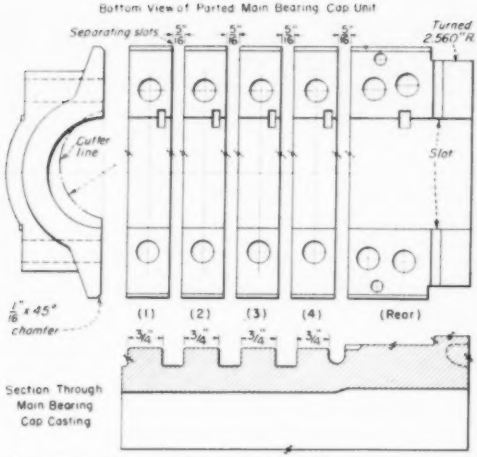
Fast wetting is important in quenching, too. The first stage of quenching, where the metal is surrounded by an envelope of vapor, must be broken fast by a wetting fluid which penetrates the vapor (second stage) so the third stage, cooling by conduction and convection, can begin. In rust prevention, the fluid must lift any moisture film from the metal, and it can do this only if it can wet the metal. High surface finish is harder to protect than a dull finish, and it is even more difficult to wet. Here again wetting power is important.

There is some difference of opinion as to why such saponifiable materials as soap, naphthenic sludges, sulfonates, and vegetable oils—mixed with mineral oils—are necessary in cutting and drawing fluids. Improved lubricating power, or oiliness, may be one reason; or it may be the properties of such materials which increase wetting power by reducing the surface tension of the liquid. However, both properties are probably present in the materials, which is one reason why they have been used, even before a cause for their advantages was advanced.

One exception to the wetting-action theory is the process of electrolytic cleaning. Fast wetting here tends to build up deposits and interfere with the passage of current. *Aaron E. Carpenter, President, E. F. Houghton & Co.*



**Cast enbloc,** the five main bearing caps constitute a rigid casting that is easily handled and clamped for the various machining operations. Above—the casting after broaching. Below—finished caps in original order




**Four saw cuts** separate the main bearing caps after the machining operations are performed. Besides saving loading time, the multiple-unit casting idea tends to improve the accuracy of the several parts

# MULTIPLE-UNIT CASTINGS REDUCE LOADING TIME

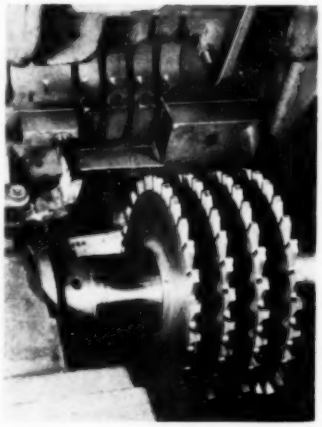
**An automobile manufacturer applies a principle that can be more widely used to cut total machining time per piece**

BY CHESTER S. RICKER,
DETROIT EDITOR

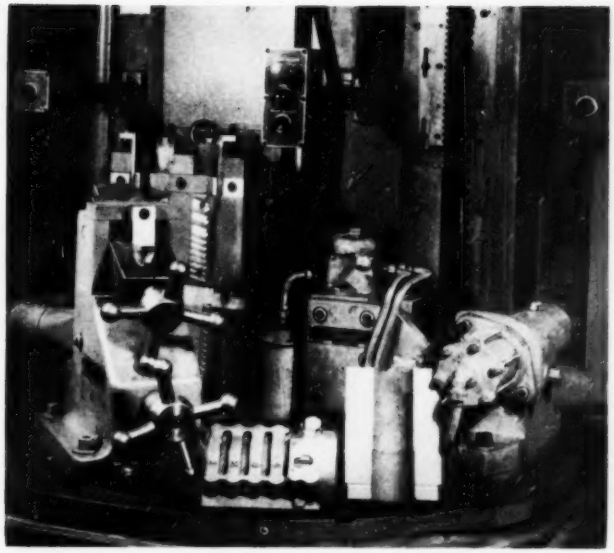
LOADING TIME tends to become an excessive portion of total floor-to-floor time when parts are machined on modern equipment tooled with carbide. The cost of loading and unloading can be sharply reduced if several similar parts are combined in a multiple-unit casting, machined in that state, then cut apart. The number of handlings will be less than for individual pieces, and there is the possibility that transfer-type machines can be used.

Oldsmobile is using the multiple-unit casting idea for two jobs: the five main bearing caps and the four brackets for the rocker-arm shaft. Machine tools for these two production lines were specially engineered to combine operations as much as possible. For example, the main-bearing job is done on four machines, but the operations involve broaching, milling, drilling, reaming, tapping, sawing apart, and finally turning a segment on the left end of the rear main-bearing cap.

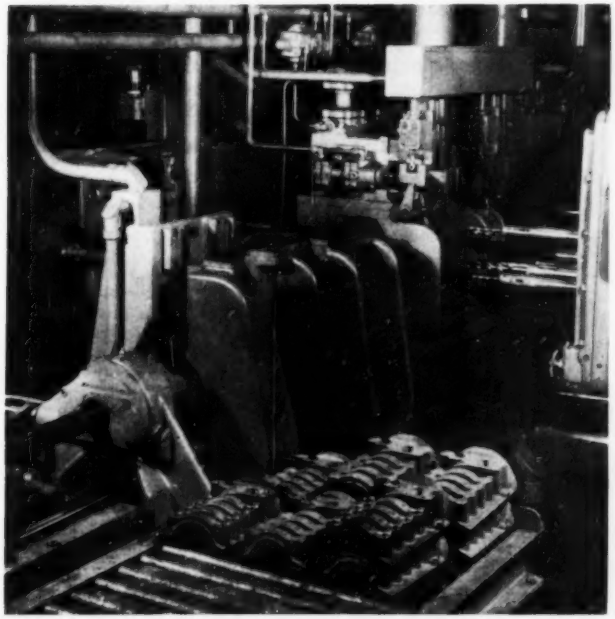
It appears that many gated castings, if properly designed, can be machined in a comparable manner. The runners might be made shorter between castings, increasing the pieces per plate and reducing the amount of scrap iron between castings. Altogether, the economies might well be considerable and easily achieved.



**Carbide-tipped saws** are keyed to the arbor in staggered relationship so that only one tooth enters the cut at a time. Part is located over pins



**Broaching,** the first operation, is performed on a double-ram machine fitted with a swinging work table. Left ram broaches both flanges of the bottom face and chamfers the edges. Right ram finishes the top face of the casting and cuts a cross groove in the bottom face



**Drilling and tapping** are handled by a shuttling machine. In the foreground is the hydraulic shuttling mechanism with the hydraulic rotating device for raising and lowering the shuttling fingers at right end of spline shaft. The shaft reciprocates to move work from station to station

## New Old Ideas

Wandering around in a machine shop recently, I overheard a couple of the boys discussing Practical Ideas in a current AMERICAN MACHINIST

"Take a look at this, Bill," one of the men smiled cynically. "This silly idea is as old as the hills. I used to do that while I was serving my time."

"So what, Harry," replied the other after glancing at the page. "It's a good one, isn't it? What's your beef?"

"I'm not beefing, exactly, but—why come to think of it I saw that idea in the magazine years ago." Harry replied. "Forgot all about it until I picked up this issue and started browsing through the pages."

"You're not complaining because it was published again after all these years, are you?"

"No, not exactly; but I should think they'd stick to new ideas."

"That one's new to a lot of fellows, Harry," reasoned Bill. "What about the younger generation coming up? They haven't seen it unless they were able to look through some old issues."

"Say, that idea gives me a good one to use on that job I'm working on now—never would have thought of it if I hadn't seen it in print again."

"So you see there really is value in printing an idea again if for no other reason than that it promotes other ideas. Say, I wonder why AMERICAN MACHINIST doesn't get out an annual number—like the equipment issue, and devote it to reprinting the best ideas of the year."

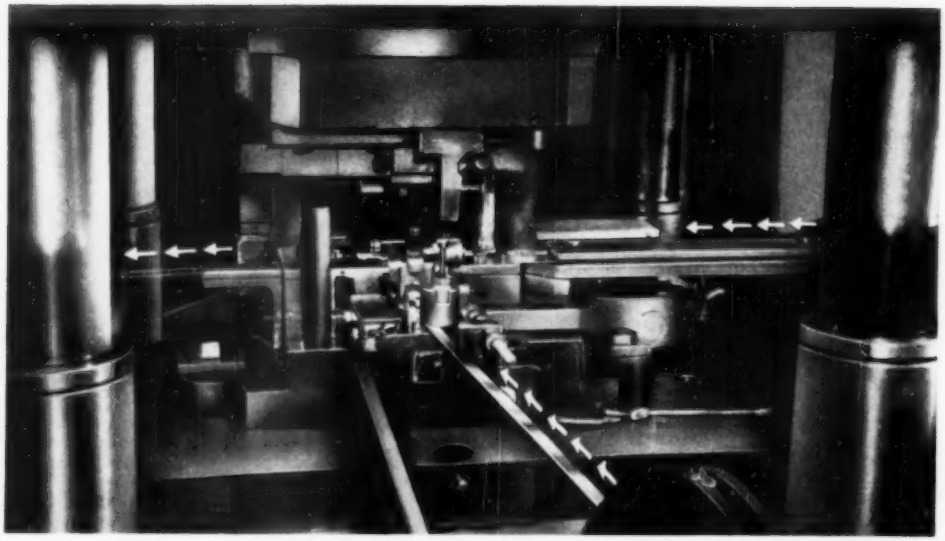
"You might have something there," agreed Harry. "Maybe if they started with the old volumes they'd bring up some really good stuff."

JACK EVERETT

## EXPENSIVE EFFICIENCY

"Your last report," the expert said,
"Showed seven rivets shy,
Now how can we efficient be
If wastes like that get by?"
A month passed by—the expert smiled
The new report was fine.
"Now here I see," he said in glee,
"You've found them all this time."
"All's there," said Pat, "but seems to me
'Taint economic ways,
I kept two men a-hunting them
For over seven days."

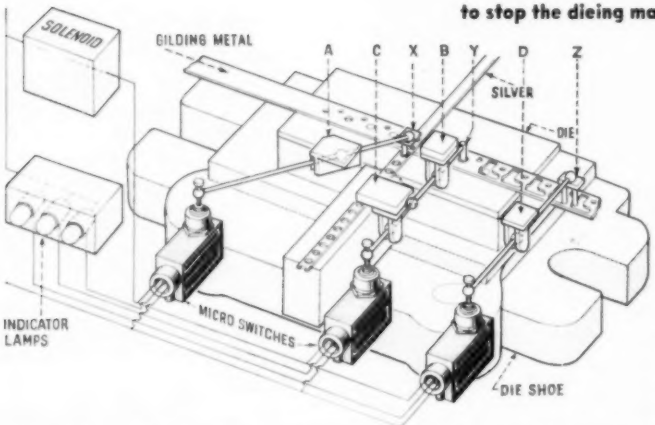
F. H. COLVIN



**Gilding-metal strip** is fed through progressive die from right to left. Silver strip is fed at right angles from reel on the front of the press

# Precision Switches Guard Progressive Die

**With 190 high-pressure strokes per minute involving two strips fed at right angles, automatic protection is essential to stop the dieing machine when stock feeds improperly**




**Automatic shutoff** of press by solenoid prevents damage if work feeds improperly. Any one of three Micro precision switches can actuate solenoid. Pads *A*, *B*, *C* and *D* attached to punch assembly (which is not shown) support actuating levers. Two probes *X* enter silver strip to check accurate advance and fact that slug has been pushed out of silver strip. Probe *Y* checks whether silver slug is in place in gilding-metal cavity. Two probes *Z* check advance of gilding-metal strip and fact that blanked piece has dropped out of strip

BY P. R. ENZLER

Superintendent, Micro Switch, Division of First Industrial Corp.

HIGH-SPEED production of 99.9% pure silver stationary contacts for standard Micro precision switches is accomplished in a progressive die with a number of features. Strips of gilding metal and silver are fed at right-angles into the die with automatic feeds. Assembly of a small silver slug into a dovetailed cavity coined into the gilding metal must be performed accurately at each stroke of the press.

Pressures developed are so high that it is essential some provision be made to prevent inaccurate feeding of the strips and misplace-

ment of the silver slugs. The 50-ton Henry & Wright dieing machine normally is operated at 190 strokes per minute, so that automatic means for shutting down the machine must operate quickly if die damage is to be prevented when there is a "pile-up." This has been accomplished by equipping the progressive die with three double-throw, metal-housed Micro precision sealed switches and three switch-actuating levers which check the following conditions at each stroke of the press:

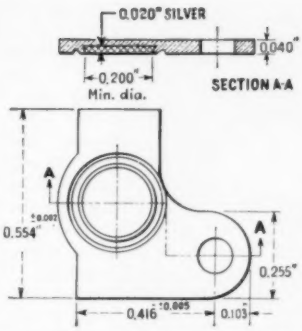
(1) The silver strip has accurately and completely advanced one full station.

(2) The gilding-metal strip has accurately and completely advanced one full station.

(3) The silver slug has been placed in the cavity for which it is intended.

If any one of these three conditions is not properly executed during the preceding stroke of the press, it is registered by search plungers carried on the inner end of each of the switch-operating levers. Movement of one of the levers closes normally-open contacts in its switch, thus energizing a large solenoid that releases the press clutch.

At the same time, normally closed contacts in the switch are opened to stop flow of current to one of the three indicating lamps mounted in a bank beside the dieset. By this means the operator can tell immediately where to look in the die for the misalignment that stopped the press. The three switches are connected in parallel with the solenoid, so operation of any one of them will stop the press. Since installation of this arrangement, no pileup has caused damage to the die or to any of the punches.




**Stationary contact** made in precision die has a silver slug swedged in pocket of the gilding-metal holder

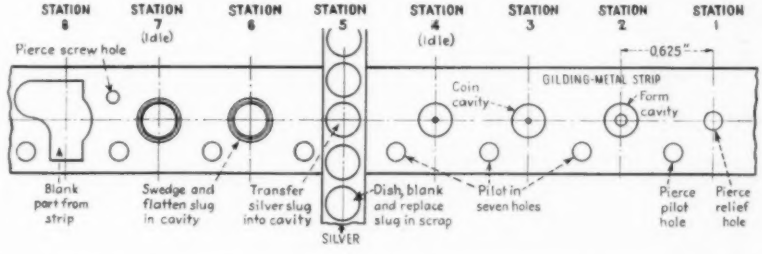
Design of the contact subassembly made in this die calls for swedging a silver slug into a dovetailed pocket in an L-shaped blank of gilding metal. Finished contact assemblies must be free from burrs, and flat on the side in which the silver slug has been inserted.

Requirements for a tight fit of the slug in its pocket, and for a low-resistance electrical contact between the silver slug and the gilding-metal holder, were difficult to meet until the punch forming the slug was arranged to dish the slug slightly before it is blanked from the silver strip. By this method, flattening of the slug when it is swedged in the cavity results in a truncated cone whose lower periphery is larger than the top. This drives the slug into the dovetail of the gilding metal.

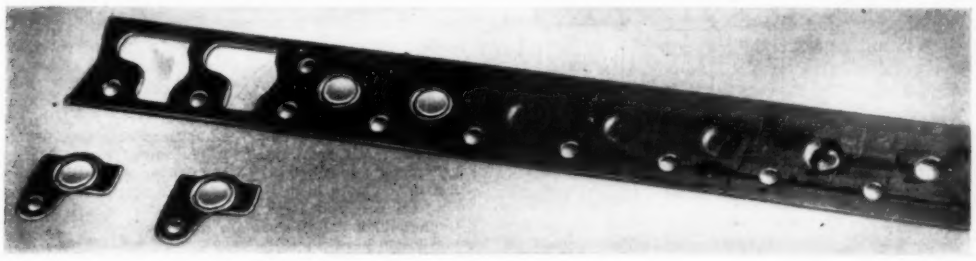
Punch and die members are assembled in a Danly precision dieset with extra-long guide bushings and 6½-in. guide pins. A long covered guide leads the gilding-metal strip into the longitudinal guide slot in the stripper plate so there will be no "whipping" of the strip because of the rapid feed rate. This strip stock is fed forward 0.625 in. during each return stroke of the press.

There are eight stations in the progressive die along the gilding metal strip. Operations performed at each of these stations are:

(1) Pierce 0.125-in.-dia. pilot




**Station layout** indicates work at each stroke of press as gilding-metal strip is fed through progressive die. Strip from press (below) shows how pockets are coined and silver slug swedged in place before completed contacts are blanked from strip



hole, and pierce 0.140-in.-dia. relief hole where cavity in strip is to be formed.

(2) Rough form slug cavity to full 0.020-in. depth with punch relieved in center to leave 0.015-in. flat around periphery of punch face. This relief in center of punch avoids excess flow of metal into scrap area of strip, which would cause binding of strip in guide slot of stripper plate.

(3) Coin slug cavity to 0.0215-in. depth with punch whose face has been relieved with 0.200-in. dia., 0.0015-in.-deep counterbore to leave a 0.018- to 0.019-in. wide flat around periphery of punch face.

(4) Idle station.

(5) At this point gilding-metal strip is below silver strip, and previously dished and blanked slug is transferred to cavity in gilding-metal strip.

(6) Coin and flatten silver slug in cavity and swedge periphery of gilding-metal cavity inward against tapered periphery of slug. At the same time, the entire surface of part to be blanked from gilding-metal strip is flattened with face of coining punch holder. Face of punch has 0.285-in.-dia. embossing circle whose section is shaped to assure proper flow of gilding metal against silver slug.

(7) Idle station. Here probe on end of lever checks to make sure slug is in position, and is properly flattened.

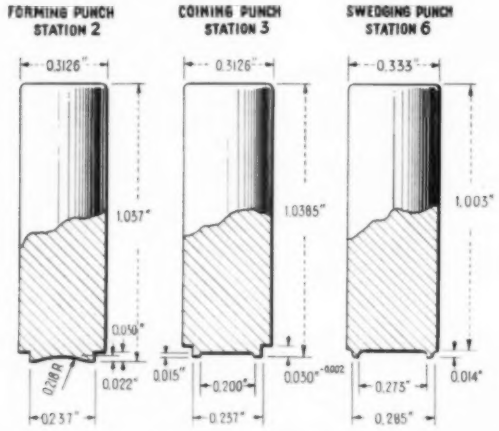
(8) Pierce 0.012-in.-dia. screw hole in workpiece in preceding position while formed punch blanks finished contact assembly from gilding-metal strip.

Seven bullet-nose pilot punches locate gilding-metal strip accurately at each die station listed above after the pilot hole is pierced. Probes on end of switch-actuating lever enter blank holes in gilding-metal strip beyond station 8. Inaccurate feeding of strip would prevent entry of these probes, thus moving the lever and actuating the switch to stop the press. The gilding-metal strip passing these stations is scrap material, and is cut off with a standard Henry & Wright scrap cutter after the strip has passed through the second set of feed rolls.

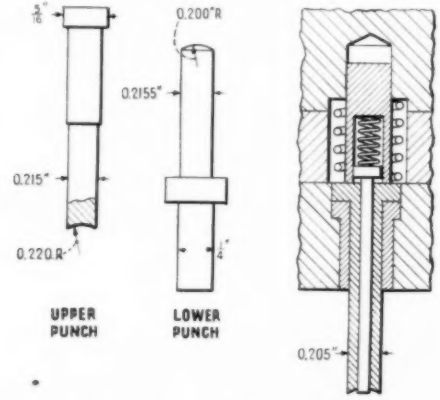
Only two press operations are performed on the silver strip. This strip is fed 0.250 in. across the die at each stroke. Three stations in front of the point where the silver slug is transferred to the gilding-metal strip, a pair of spring-loaded punches, one in the punch-holder assembly and one in the die assembly, dish the slug to a convex shape, blank it from the strip, and then return it into the strip for transfer to the loading station.

Spring under the lower punch is stronger than the spring above upper punch. As punch assembly moves down and upper punch contacts the silver strip, the lower punch resists movement, forcing dimple into silver strip, until spring above upper punch is compressed fully and punch is bottomed in its retainer. Then upper punch moves down, blanking slug from strip. When punch assembly again moves upward, slug is held between the two spring-loaded punches and the heavier spring under lower punch causes slug to be moved back into hole in silver strip.

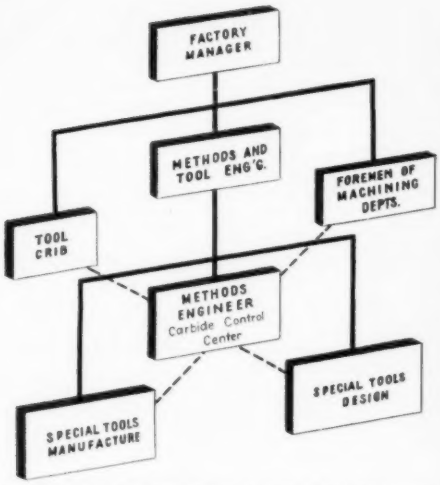
As scrap strip of silver moves toward scrap cutter, it passes two bullet-pointed pilot pins. Between slug transfer station and these pilots are two positions where probes are entered into holes in strip by switch-operating lever. If slug has not been transferred to gilding-metal strip, movement of probe downward with punch assembly is resisted, and lever actuates switch to stop press.




**Heavy shanks** on all three punches are welded for resistance to pressures required. Auxiliary punch-holders extend almost to face of punches




**Silver slug is dished** between spring-loaded upper and lower punches, then blanked from strip when upper punch bottoms in holder and forces slug and lower punch down below strip at bottom of press stroke. Transfer punch (right) to push silver slug from silver strip to cavity in gilding metal has hole in center for a stripper punch. Face of transfer punch has a spherical indentation so the dished shape of the slug will not be distorted




**Carbide tooling organization** is integrated with normal operations. The carbide control center is responsible for carbide application (routing, specification of tools, test runs, specification of speeds and feeds), coordination, and trouble-shooting on carbide applications

**Time calculating chart** contains nomographs to plot the required rpm. and the number of revolutions required for an operation. These figures give the machining time required

# CARBIDE CONTROL CUTS INVENTORY COSTS

**Coordination of all carbide-tool operations at Cleveland Automatic Machine Co. has resulted in more efficient application**

THE EFFECT of rising costs of labor and raw materials has been substantially offset at Cleveland Automatic by the application of carbide tooling on a coordinated plant-wide basis, according to Joseph C. Maezer, factory manager. Production savings realized by carbide-tipped cutting tools have been an important factor in helping to maintain product quality at current market prices.

Cleveland Automatic Machine Company of Cincinnati builds automatic chucking, forming, and screw machines, hydraulic die-casting machines, special machinery, and handles a volume of sub-contract work, generally consisting of short runs on highly specialized parts.

The constant improvements, modifications, and built-to-order nature of its products make long production runs impractical. In general, its production can be considered as being on a job-lot basis. A real problem in many plants, this condition is offset largely by the efficient use of standard carbide tooling, and special carbide tools where necessary for the greatest savings possible in machining large, heavy work. At present, the one-shift employment force numbers about 350.

Carbide tools, of standardized design, are being used on about 85% of all turret- and engine-lathe operations. Carbide tooling —standard and special—is also widely employed in boring-mill, screw-machine, and milling-machine operations and to a lesser degree in planing and other departments. A wide range of materials are machined, including hard bronzes, tough fibrous nickel-chrome steel, and hard high-chrome steel.

The key to this company's effective use of carbides is the successful coordination of all elements of a centralized tool-control program. The organization chart shows that the methods engineer, while at the hub of tooling activities, does not have a supervisory relationship to other sections involved in the carbide-tooling program. He functions more as a coordinator in addition to being directly responsible for tool specification and the setting of production standards.

### *Early Development*

While cemented carbides had been used previously and recog-

nized as providing many savings in production, plant management in 1945 concluded that more could be done in extending the application of carbide cutting tools and in obtaining the maximum benefits from their use. These basic steps were taken:

(1) Selection of two men from the Incentive and Methods department to head the program. These men were given advanced training at the Carboloy Training School in Detroit.

(2) Standardization of sizes, grades, and types of carbide tools for engine and turret lathes, milling machines, boring mills, and other machine tools.

(3) Design of standard boring bars and toolposts required for standard cutting tools to be used efficiently on each machine.

(4) Overhaul or modification of various machine tools to provide necessary rigidity and safety in using carbide tools at their greatest efficiency.

(5) Determination of most economical speeds, feeds, and depths of cut by actual machining tests with the selected standard tools on materials commonly used in the plant.

(6) Training of key personnel by group meetings in the plant, using Carboloy training films and literature.

(7) Centralization of grinding facilities with availability of specialists trained in the grinding of carbides.

The resulting program was highly effective. And, although the plant was later moved from Cleveland to Cincinnati and many of the original personnel were lost, the program they had established was readily adopted by new personnel.

### Early Conclusions

Some of the conclusions reached at an early date are just as applicable to management's present approval of a wide usage of carbide tools and a centralized tool-control program. These include:

Carbide tools can be efficiently used by the average machine operator once he has been properly informed of the differences between handling carbide and high-speed-steel tools.

Carbide tools of standard design can be used on a majority of all lathe operations, as well as on routine cuts made by other machine tools.

While performance alone justifies carbide tooling from an economical viewpoint, even greater savings can be realized by coordination of all phases of carbide usage, including centralized grinding of carbides with trained specialists and the correct equipment.

Responsibility for the efficient application of carbides is centered in methods engineering. When the drawing for a new part has been completed, the methods engineer and his assistant make up the routing sheets, specifying the department where each operation shall be done, the holding devices, cutting tools, and production standards.

Originally, the cutting tools were not always specified for operations involving routine cuts only. The machinist handling the job then selected the proper tool from a number of "standards," by referring to a blueprint which shows the standard tools recommended for different materials and types of operation.

A time calculating chart aids in specifying the correct speeds and feeds for an operation. These charts, available for turret lathes, engine lathes, and milling machines, were adopted after long research undertaken when the carbide program was first established.

On the turret-lathe and engine-lathe charts, two parallel nomographs enable the methods engineer to quickly plot the required rpm. and the number of revolutions required to finish a cut.

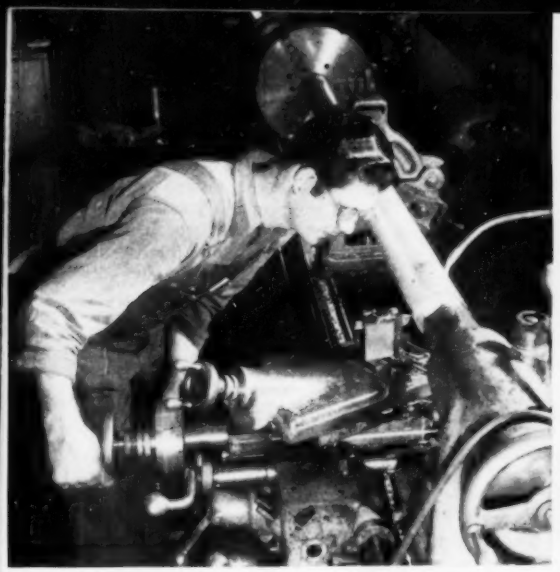
A straight rule laid along the now known rpm. and number of revolutions to complete the cut will cross two lines (one for carbide and the other for high-speed tools) at the number of time units required to complete the cut. Using the formula of 70 units = 1 hour, which allows for operator

#400 DIE CAST | D-393

| | |
|---|---|
| DEPT. | LATHE |
| PIECE NAME | INDEX RING |
| MATERIAL SIZE | 6" RD X 1 3/8 LG |
| MATERIAL | SAE X 1315 |
| OPERATION DETAILS | SEE BELOW |
| DATE | |
| SHEET NO. | |
| LBS. | |
| OP. NO. | 1 |
| REV MACH NO. | |

| HOLDING MEANS | BREAK DOWN | DIA. OR LGTH | LGTH CUT | NO CUTS | PIECE HDLG TIME | MACH HDLG TIME | MACH TIME | S.U. OTO TIME | R.P.M. | FEED |
|---|---|---|---|---|---|---|---|---|---|---|
| 3 J.CH | DRILL | 1 3/4 | 2" | 1X | .56 | .43 | 6.60 | 5.55 | | |
| | FACE | 6" | 2 1/8 | 1R | | .25 | .89 | | 179 | .019 |
| | | | | 1F | | .87 | 1.15 | | 223 | .011 |
| | FACE FOR HUB | 6" | 3/4 | 1R | | .25 | .30 | | 179 | .019 |
| | | | | 1F | | .87 | .43 | | 223 | .011 |
| | TURN FOR HUB | 4 1/2 | 1/4 | 1R | | .72 | .08 | | 223 | .019 |
| | | | | 1F | | 1.28 | .14 | | 223 | .011 |
| | BEVEL HUB | | | 1X | | .57 | | | | |
| TAPER TURN | BORE TAPER | 4 1/16 | 1 1/4 | 12R | | 8.10 | 7.08 | | 223 | .011 |
| | | | | 1F | | 1.85 | .75 | 9.95 | 290 | .008 |
| ATTACH | TURN O.D. TO JAWS | 6" | 1" | 1R | | .72 | .45 | | 160 | .019 |
| | MARK LGTH. | | | | | | | | | |
| TRUE-JAW | FACE TO LGTH | 6" | 7/8 | 1R | .56 | .25 | .38 | | 179 | .019 |
| | | | | 1F | | .87 | .50 | 6.30 | 223 | .011 |
| | TURN BAL O.D. | 6" | 1/4 | 1R | | .72 | .12 | | 160 | .019 |
| | CHAMFER | | | 3X | | 1.47 | | | | |
| | | | | | | | ST ALL | 5.08 | | |
| TOTAL—BASE TIME | | | | | 1.12 | 19.22 | 18.79 | 26.88 | | |
| TOTAL—PURE & S.U. UNITS | | | | | 39.13 | | | | | |
| TOTAL—UNITS ALLOWED | | | | | | (39) | | (27) | | |

**Computation form** contains data assembled from time calculating charts. Pre-production estimates of machining costs and scheduling of work are done with the aid of this form



**Threading operation** on a ground shaft with a standard carbide tool eliminates up to 81% of the machining time required with a high-speed tool. This operation is still considered experimental and changes in chip breaker, clearances, and rpm. may further improve the performance

**Tool orders** are filed under the operator's clock number. The accumulated orders present an easily accessible record of what equipment is charged to each operator

fatigue and other variables, the time for the entire operation can be determined.

The data obtained from these charts, and from similar ones used in calculating non-productive time, is recorded on a computation form. These figures, totaled, facilitate pre-production estimates of the machining costs for any proposed work, and facilitate the scheduling of work for production.

### *Establishing a "Standard"*

In establishing a "standard tool" for a given type of operation on a given material, the methods engineer—in cooperation with the proper productive department and the tool crib—runs tests on a sample piece of work material. In every experimental or pilot run, a wattmeter is used to prevent any accidental overloading of the machine. The results are recorded and kept as a permanent record.

In establishing standards on a new application, no definite decisions are made until every practical variation of feed, speed and tool design has been actually tested. In the threading operation illustrated, the tool has already chalked up an 81% saving, but is still considered in the experimental stage and will not become standard for this type of work until the last possible variation in chip-breaker dimensions and clearance angles has been tried.

A special tools fabrication group (3 men) handles most of the tool fabrication done within the plant. Their work, however, consists largely of building special jigs and fixtures and other general tool work. Brazing on of carbide tips is done in the welding department, while all grinding is assigned to the toolroom.

### *Tool Numbering System*

A tool numbering system has been set up that permits quick identification of standard carbide tools. The first letter of a number indicates the work material to be machined: S = steel, and Z = cast iron or bronze. The second letter indicates the function of the tool: F = facing, T = turning, and B = boring. The first number indicates size of tool shank: 1 = $\frac{3}{8}$-in. sq. shank, 2= $\frac{1}{2}$-in. sq. shank, 3 = $\frac{3}{4}$-in. sq. shank, and 4 = 1x1$\frac{1}{4}$-in. shank. The second number is peculiar to a particular tool, indicating the dimensions to which that tool is ground.

An example of a standard carbide tool number is ZB24, a $\frac{1}{2}$-in. sq. shank tool for boring cast iron or bronze. The last digit shows that it is the fourth variation of this style of tool.

Other than standard carbide tools are described by a prefix CT (indicating cutting tool) and a progressive or serial number, as CT21692 or CT21693. Variations of a tool represented by an individual tool drawing may be indicated by adding a hyphenated number, as CT21693-2.

One centralized tool crib is responsible for storing and distributing all expendable tools and equipment to all departments. This tool crib stocks and distributes jigs, fixtures, gages, and other items as well as all cutting materials. A separate fixture room on another floor, also under the supervision of the tool-crib supervisor, with one man in attendance, is used to store the larger dies and fixtures.

Also located in the main tool crib is the grinding equipment needed to service cutting tools. Single-point high-speed-steel tools are generally ground by the opertator at the machine. Carbide-tipped tools are required to be ground at the tool crib.

### *Requisitioning*

One man is designated to grind all single-point carbide-tipped

tools and to tend the counter for distribution of new carbide tools and exchange reground tools for dull ones.

An operator brings a dull tool to the crib and receives a reground one in return. Exchange of one cutting tool for another of the same style involves no paperwork at all.

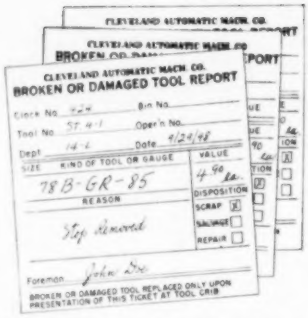
When not returning a tool in exchange, a machininst requiring a tool from stock fills out a triplicate tool order, one copy which he keeps, and two copies of which are placed by the crib attendant under a spring clip marked with the man's clock number, on a McCaskey board. This is the same procedure employed for other materials stocked in the crib, except that in the case of precision gages and other items of considerable value or items of which only one or two duplicates are stocked, the second copy of the tool order is placed on a board in a companion cabinet, under a clip marked with the gage or tool number.

When a cutting tool is returned to the crib without another being taken in exchange, the attendant takes from the McCaskey board the duplicate copies of the tool order covering that type of tool and gives them to the operator, who destroys them.

Because milling cutters are all charged to one department, no strict control is kept on them. The foreman of the milling department generally comes into the crib, selects the required cutter, and returns it when the job is complete. This deviation from the standard procedure was adopted in order to avoid special training of tool-crib attendants in the identification of milling cutters, the selection of cutters being largely visual.

### Broken Tools

When a carbide tool has been lost, badly damaged, or broken, the cause is reported on a broken tool report form. This form requires the signature of the foreman. The tool and broken tool report, when turned in at the tool crib, must be accompanied by a materials requisition. Before the requisition is disposed of, a tool of the same description as the broken one is transferred from the reserve stock to the active stock. This procedure, in effect, results in the broken or lost tool being charged against the department where the loss occurred.


CLEVELAND AUTOMATIC MACH. CO.
BROKEN OR DAMAGED TOOL REPORT
Clock No. 544 Bin No.
Tool No. 57 4-1 Oper'n No.
Dept. 14-2 Date 4/24/48
SIZE KIND OF TOOL OR GAUGE
78B-GR-85
VALUE 4.90 ea.
REASON
Slip Ground
DISPOSITION
SCRAP X
SALVAGE
REPAIR
Foreman John Doe
BROKEN OR DAMAGED TOOL REPLACED ONLY UPON PRESENTATION OF THIS TICKET AT TOOL CRIB

**Broken tool report** records any tool loss and indicates the disposition of a damaged or broken tool

The broken or damaged tool is inspected by the tool-crib supervisor, who notes on the broken tool report whether the tool can be salvaged. The broken tool report is retained on a McCaskey board under a clip marked with the operator's number. These are referred to from time to time when an operator is considered for promotion and on other occasions. Once a year the reports are removed and recapitulated, to provide a permanent record of tool loss attributed to each operator.

### Inventory Control

Perpetual inventory records are maintained in a visible record cabinet with slide drawers, in which cards lay flat. All cutting tools are grouped together, and one drawer is devoted to standard Carboloy tools. For each tool number there is one card which is a perpetual inventory record and another which is a purchase record.

Material requisitions, as received by the crib, are deposited in a wire basket on the supervisor's desk. Once or twice a day, the tool-crib supervisor takes these and records on the inventory record, the order number (an account number assigned to each department for specific cost items) and the number of tools drawn from the reserve stock.

In turn, the materials requisition is filled in with the unit cost and total cost of the material, this information being obtained from the purchase record. The requisitions are then forwarded to cost accounting where the charges are recorded against the proper account.

These cards and the broken tool reports are available at any time that a particular department's expenses are found to be unusual. Cost reports are not ordinarily issued to the department foremen but are directed to the factory manager who investigates any seemingly excessive costs that are noted.

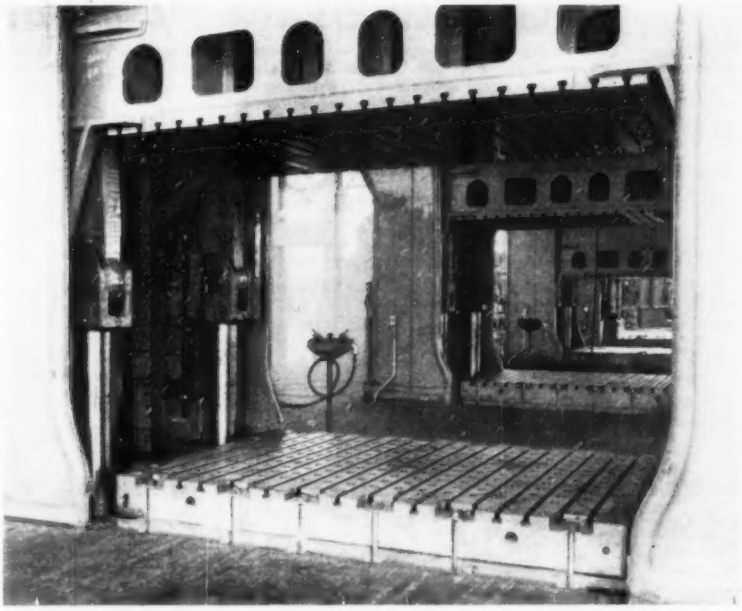
Established minimum and maximum quantities based on a normal month's requirements, and recorded on the inventory card, control the reorder of tools. When the balance shown on the card falls below the established minimum figure, the stock must be renewed. The tool-crib supervisor removes the purchase record from the drawer, fills in the date, order number, and quantity required to bring the supply up to the maximum figure, and forwards the card to purchasing, where the actual purchase transactions are handled. Here, the pertinent information is filled in on the purchase record. Any change in price is thus recorded and provides the basis for future charges made against the department requisitioning this type of tool.

When the purchase transaction has been completed, the purchase record is returned to the tool-crib supervisor who replaces it in its proper place. At the time the material is received, the purchase record is so noted, and the quantity is added to the inventory record. The tools are placed in the reserve stock.

### Grinding Carbide Tools

In the grinding of carbide tools, the grinder hand follows explicitly a standard procedure. These written "grinding standards" specify the wheels to be used, proper care of wheels, sequence of steps in grinding a tool, and other points.

Exact grinding specifications for all standard single-point carbide tools are shown on the tool chart. Special tools are ground to specifications given on individual tool drawings.



**Standardized sizes** of bolster plates and rams, also location of T-slots and pressure-pin holes, will minimize problems in mounting dies in presses, and when shifting them to another press in case of breakdown

# Press-Room Standards

**INVESTIGATION among users of presses in the Detroit area demonstrated lack of interchangeability of dies between presses of various makes, as well as between divisions and outside companies. This situation prevailed because no standard practice existed for the mounting of dies and diesets to the bolster plate and ram, and because presses were not standardized in uniform increments of left-to-right and front-to-back dimensions. Because no single company could speak for the automotive industry and manufacturers of stampings in general, an Automotive Joint Industry Conference was established. Thus far, standards have been developed for single- and double-action presses, these standards are now in use, and they have been submitted to the American Society of Mechanical Engineers for consideration as a national standard. Further standards on gap and inclinable presses, die cushions and other subjects are under development. When this work is completed a significant forward step will have been taken to achieve economies in peacetime use of presses and to promote flexibility in use of facilities during a time of national emergency.**

**Because these standards can simplify pressroom operations in other than automotive plants, as well, AMERICAN MACHINIST summarizes them in this special report.**

A SPECIAL American Machinist REPORT TO THE METALWORKING INDUSTRIES

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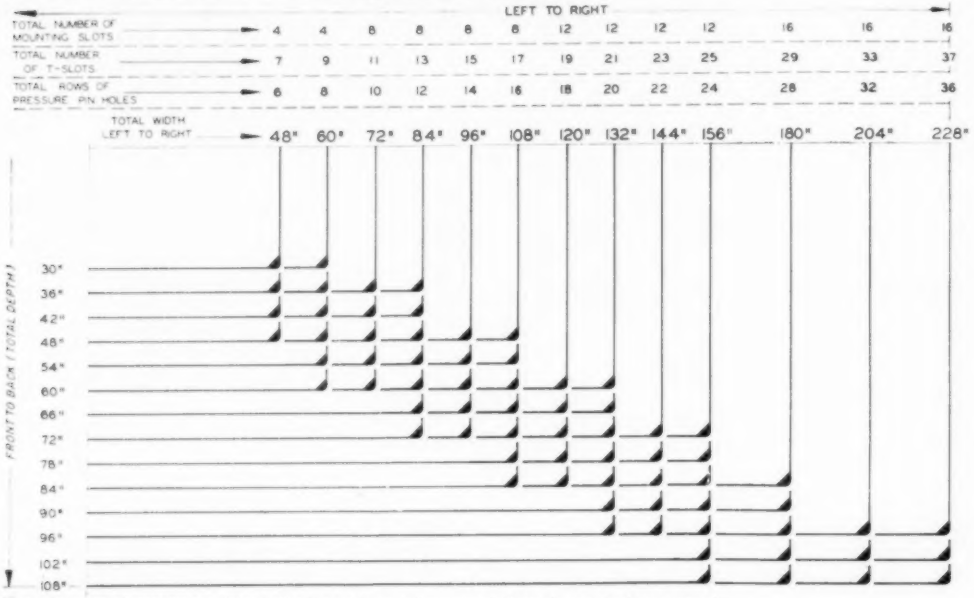
# SELECTION CHARTS FOR STANDARD PRESS SIZES

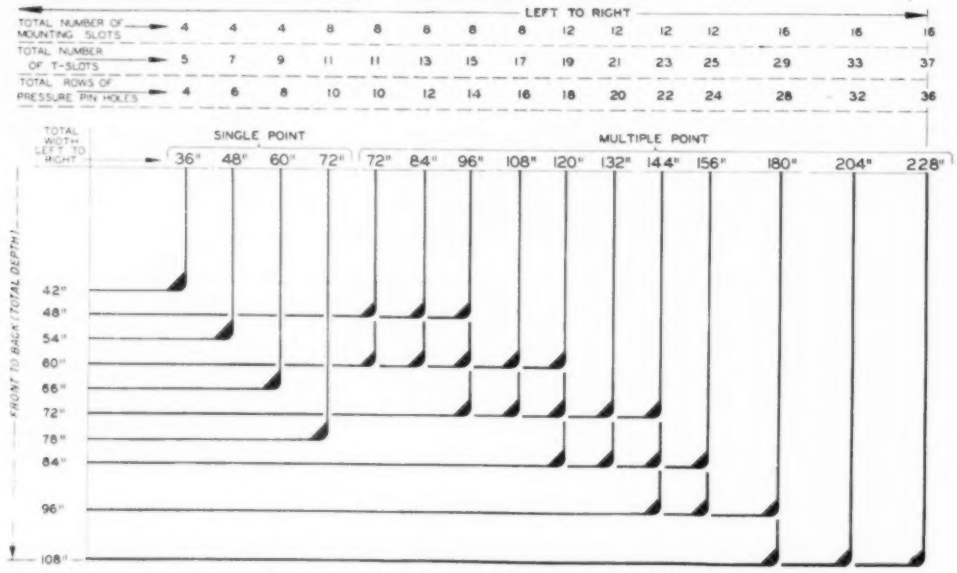
Standard sizes of single-action, multiple point presses and double-action, single and multiple point presses are listed in the charts below. Example: in single-action presses, a press with standard left to right dimension of 48 in. is available in standard front to back dimensions of 30, 36, 42 and 48 in. The charts also show the total number of mounting slots, T-slots and rows of pressure-pin holes for bolster plates of the standard presses.

## SINGLE ACTION . . . Multiple-Point Presses




Notes: For range of tonnages see 100 and 101. For total rows of pressure-pin holes, front to back, see page 98.

## DOUBLE ACTION . . . Single- and Multiple-Point Presses


LEFT TO RIGHT
TOTAL NUMBER OF MOUNTING SLOTS 4 4 4 8 8 8 8 8 12 12 12 12 16 16 16
TOTAL NUMBER OF T-SLOTS 5 7 9 11 11 13 15 17 19 21 23 25 29 33 37
TOTAL ROWS OF PRESSURE PIN HOLES 4 6 8 10 10 12 14 16 18 20 22 24 28 32 36
TOTAL WIDTH LEFT TO RIGHT
SINGLE POINT
MULTIPLE POINT
36" 48" 60" 72" 72" 84" 96" 108" 120" 132" 144" 156" 180" 204" 228"
FRONT TO BACK (TOTAL DEPTH)
42" 48" 54" 60" 66" 72" 78" 84" 96" 108"

Notes: For inner and outer ram tonnages see pages 102 and 103. For total rows of pressure-pin holes, front to back, see page 98.

# ANALYSIS OF JIC STANDARDS FOR SINGLE- AND DOUBLE-ACTION PRESSES

These standards cover the "tooling area" of presses and include the means for locating and mounting dies, but do not otherwise restrict press manufacturers. Details of the standardized elements are:

### *Bolster Plates*

#### Over-all Dimensions

The bolster-plate size is the press size. Dimensions of the bolster plate are given in even inches only, and advance in a definite progression. The 69 standard single-action presses start with a left-to-right dimension of 48 in., and this dimension advances by 12-in. increments to the 156-in. size and next by 24-in. increments to the 228-in. size. Front-to-back dimensions begin at 30 in. and advance by 6-in. increments to the 108-in. size.

Double-action presses in the single-point type start with a left-to-right dimension of 36 in. and advance by 12-in. increments to the 72-in. size. The multiple-point, double-action presses begin with a 72-in. left-to-right dimension and advance by 12-in. increments to the 156-in. size, and thereafter by 24-in. increments to the 228-in. size. Front-to-back dimensions of single-point presses start at 42 in. and advance in 12-in. increments to the 78-in. size. For multiple-point presses, the front-to-back dimension starts at 48 in. and advances by 12-in. increments to 108 in. Altogether, there are 27 standard sizes of double-action presses.

### *Thickness*

The thickness of the bolster plate depends on the tonnage rating of the press. In some instances, the bolster plate for a single-action press may serve also for a double-action press.

### *T-Slots*

No tapped holes are permitted in the bolster plate for die hold-down purposes. To avoid the troubles of tapped holes with broken threads or plugged with broken bolts, 1-in. American Standard T-slots run from front-to-back of the bolster plate, starting at the center and progressing outward at 6-in. intervals. This close spacing makes it easy to mount more than one die in the press at the exact positions required. Use of a single size of T-bolt simplifies die mounting.

### *Pressure-Pin Holes*

A "map system" identifies the rows of pressure-pin holes for the convenience of the die designer and the die setter. Rows start at 3 in. from either centerline, progress outward by 6-in. increments. Letters *A, C, E* . . . identify rows above the left to right centerline: alternate letters *B, D, F* . . . identify the rows below this centerline. Numerals 1, 3, 5 . . . identify rows to left of the front-to-back centerline; numerals 2, 4, 6 . . . identify the rows to the right of that centerline. The die designer chooses certain holes for pressure pins, has these hole locations stamped on a brass tag to be affixed to the front of the die. At die setting there need be no fumbling in selection of pressure-pin holes or time lost in tryout.

### *Locating-Pin Holes*

Two 1 11/16-in. holes are placed at diagonal corners of the bolster plate to align it with the press bed and ram.

### *Hole Tolerances*

Pressure-pin holes and locating-pin holes are referenced to the bolster-plate centerlines to a tolerance of ±0.015 in. to facilitate and encourage jig drilling.

### *Handling-Hook Holes*

All four corners of the bolster plate are drilled and tapped with a standard hole pattern. The size of tapped hole depends on the size of the bolster plate, and hence the load. These tapped holes are used to apply a forged handling hook which has an adequate safety factor, and which permits much safer handling of heavy bolster plates than chain slings or rollers.

### *Mounting Slots*

U-shaped mounting slots $1\frac{3}{8}$ in. wide are cut in the front and rear of the bolster plate at intervals dimensioned from the front-to-back centerline. These $1\frac{3}{8}$-in. slots receive $1\frac{1}{4}$-in. mounting bolts that engage $1\frac{3}{8}$ in. mounting slots in the press bed.

### *Press-Bed Dimensions*

Locating-pin holes and mounting slots are laid out to the same patterns as used in bolster plates. Standardized bed openings have been approved, and standards on die cushions will be developed.

### *Press Rams*

In single-action presses, the ram is the same size as the bolster plate, instead of being smaller, and this change avoids the need to "butcher" dies to make them fit. T-slots on 6-in. centers, starting at the centerline (front to back), replace bolt holes and tapped holes in bastard layouts. Upper-die members will be held to the ram with 1-in. T-bolts passing through lugs on the tool. Mounting slots may be used on the front and back of the ram for any die that might extend past the ram face.

In double-action presses, the outer ram is the same size as the bolster plate.

Provision of knockout holes in the ram of the press and the travel of knockout bars are subject to agreement between press manufacturer and user.

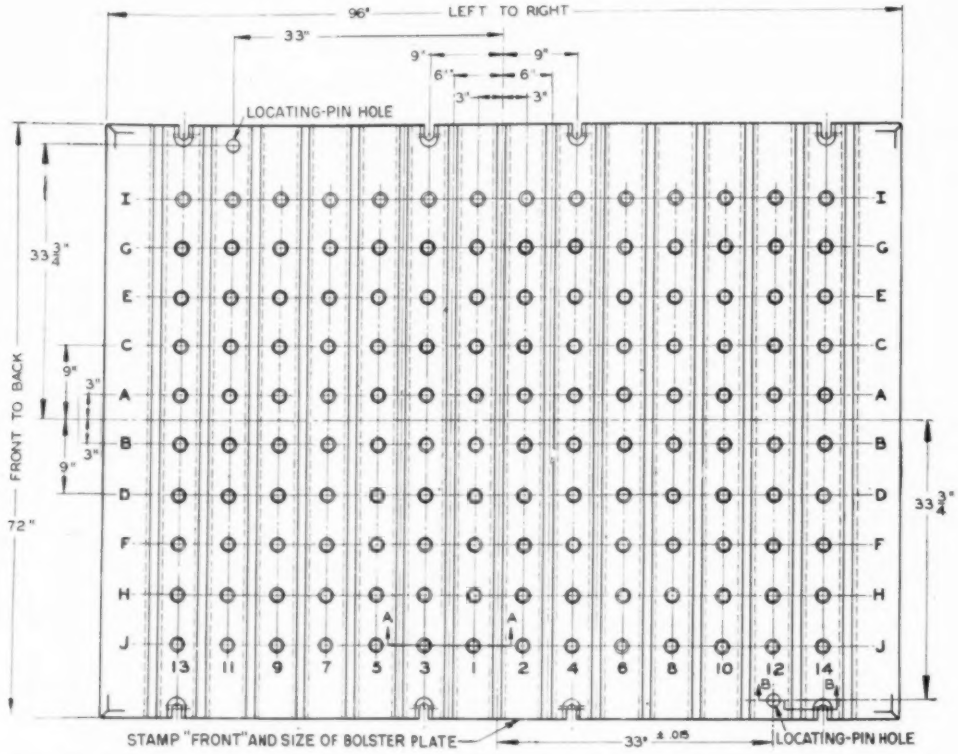
### *Length of Stroke*

The length of stroke of single-action presses of various capacities is given in the table on page 104.

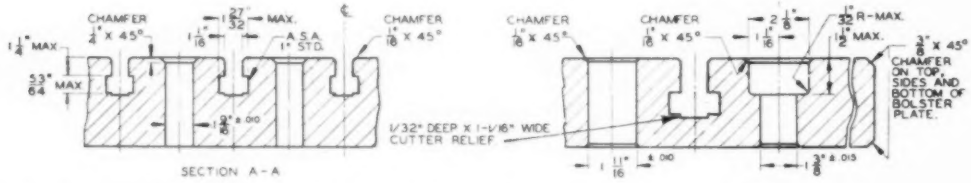
At the time of publishing this Special Report, the length of stroke of double-action presses had not been decided by the Automotive Joint Industry Conference on Press-Room Standards.

# BOLSTER PLATE DETAILS

## NUMBERING SYSTEM and uniform spacing of pressure pin holes and "T" slots




**A typical 96x72-in. bolster plate** shows the numbering system and uniform spacing of pressure-pin holes and T-slots. These details are identical in bolster plates for single- and double-action presses of equal size.



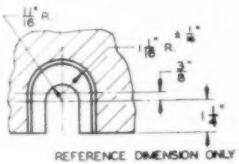

**Rows of pressure-pin holes,** from right to left, are identified by numbers, starting from the front-to-back centerline. Even numbers are used for rows to the right of the centerline; odd numbers for rows to the left of the centerline. The rows start at 3 in. ±0.015 from the centerline and are spaced at 6-in. intervals, but all dimensions are taken from the centerline and the ±0.015-in. tolerance applies.

Rows of pressure pins, front to back, are identified by letters, and start from the right to left centerline. Letter *A* and alternate letters identify rows back of the centerline; letter *B* and alternate letters identify rows in front of the centerline.

T-slots are laid out at 6-in. intervals from the front-to-back centerline.

Locating-pin holes are placed at the left rear and right front of the bolster plate.

SECTION B-B



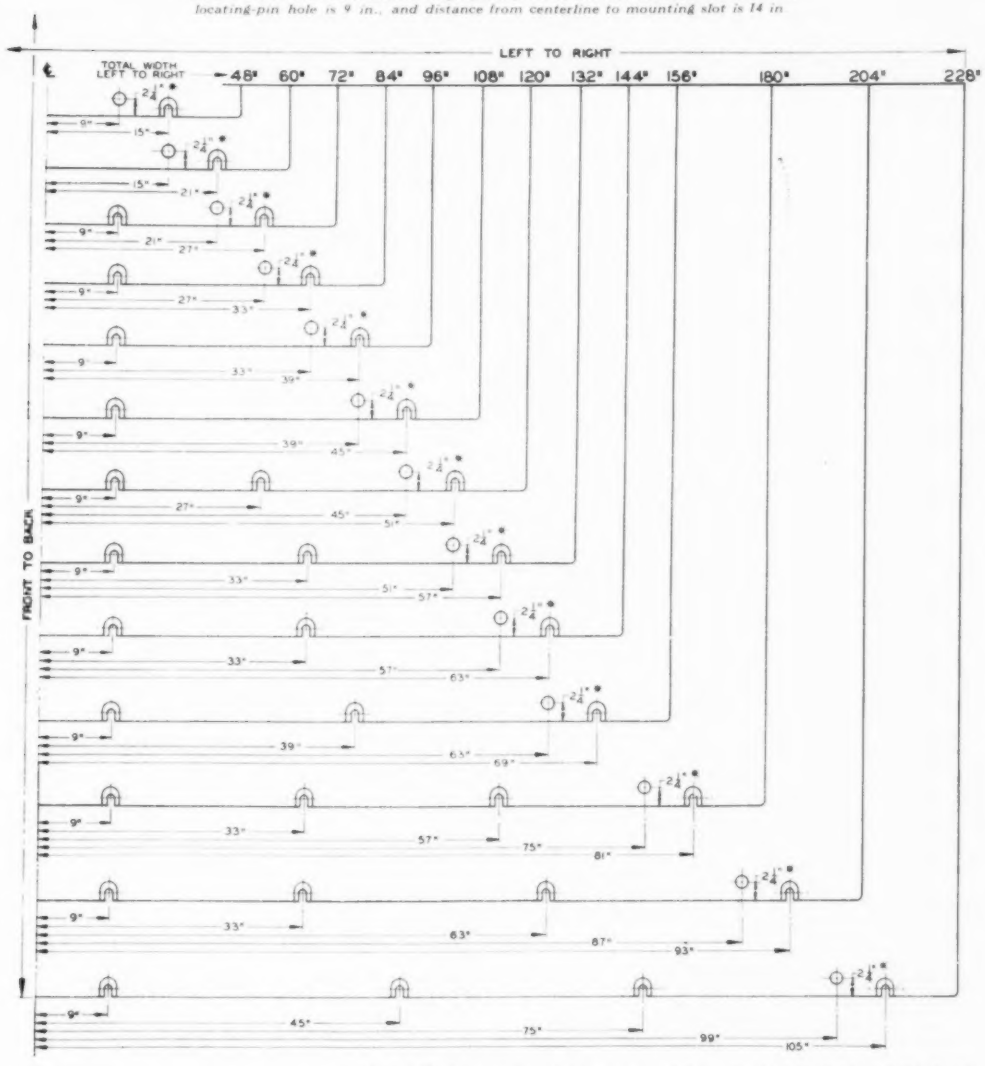
# SPACING OF MOUNTING SLOTS AND LOCATING-PIN HOLES

## in bolster plates for both single- and double-action presses

Mounting slots are machined in both cast iron and steel bolster plates in order to assure interchangeability in mounting. A $1\frac{1}{4}$-in. mounting bolt is used for all sizes of bolster plates, and the number of mounting slots shown below is deemed sufficient because the air cushions are not permitted to strike the bolster plate. Instead they bear against an air pad, and the distance between top of the air pad and bottom of the bolster plate is specified as $\frac{1}{2}$ in., plus zero, minus $\frac{1}{8}$ in., and parallel.

The two locating pin holes at diagonal corners of the bolster plate are for the purpose of locating and stacking risers, spacers and bolster plates to the press bed. A removable stop or other means prevents the locating pin from dropping out.

*NOTE: For 36-in. double-action, single-point presses, the distance from centerline to locating-pin hole is 9 in., and distance from centerline to mounting slot is 14 in.*




* REFERENCE DIMENSION ONLY

Notes: Each mounting slot is measured from the left to right and the front-to-back centerlines of the bolster plate within a tolerance of ±0.032 in.

Each locating-pin hole is measured from the left-to-right and front-to-back centerlines within a tolerance of ±0.015 in.

# BOLSTER PLATE DETAILS...CONTINUED

## THICKNESS, FRONT TO BACK DIMENSION (DEPTH) AND TOTAL ROWS OF PRESSURE-PIN HOLES (FRONT TO BACK)

### SINGLE ACTION—MULTIPLE POINT

| CAPACITY, TONS | BOLSTER PLATE Thickness | BOLSTER PLATE Depth | Rows of Holes |
|---|---|---|---|
| 50 | 3½ | 30 | 4 |
| 75 | 4 | 30, 36 | 4 |
| 100 | 4½ | 30 36 | 4 |
| 100 | 4½ | 42 | 6 |
| 100 | 4½ | 42 | 4† |
| 125 | 5 | 30, 36 | 4 |
| 125 | 5 | 42 | 6 |
| 125 | 5 | 42 | 4† |
| 150 | 5½ | 36, 42 | 4 |
| 150 | 5½ | 48 | 6 |
| 200 | 6 | 36, 42 | 4 |
| 200 | 6 | 48, 54 | 6 |
| 250 | 6½ | 42 | 4 |
| 250 | 6½ | 48, 54 | 6 |
| 250 | 7 | 60, 66 | 8 |
| 300 | 7 | 48, 54 | 6 |
| 300 | 7 | 60 | 8 |
| 300 | 7½ | 66 | 8 |
| 300 | 7½ | 72 | 10 |
| 400 | 7½ | 54, 60 | 6 |
| 400 | 7½ | 66 | 8 |
| 400 | 8 | 72 | 8 |
| 400 | 8 | 78 | 10 |
| 500 | 8 | 54, 60 | 6 |
| 500 | 8 | 66 | 8 |
| 500 | 9½ | 72 | 8 |
| 500 | 9½ | 78, 84 | 10 |
| 500 | 9½ | 90 | 12 |
| 500 | 11½ | 96 | 12 |
| 500 | 11½ | 102, 108 | 14 |
| 600 | 8½ | 60 | 6 |
| 600 | 8½ | 66 | 8 |
| 600 | 10 | 72 | 8 |
| 600 | 10 | 78, 84 | 10 |
| 600 | 10 | 90 | 12 |
| 600 | 12 | 96 | 12 |
| 600 | 12 | 102, 108 | 14 |
| 800 | 9 | 60 | 6 |
| 800 | 9 | 66 | 8 |
| 800 | 10½ | 72 | 8 |
| 800 | 10½ | 78, 84 | 10 |
| 800 | 10½ | 90 | 12 |
| 800 | 12 | 96 | 12 |
| 800 | 12 | 102, 108 | 14 |
| 1000 | 11 | 72 | 8 |
| 1000 | 11 | 78, 84 | 10 |
| 1000 | 11 | 90 | 12 |
| 1000 | 12 | 96 | 12 |
| 1000 | 12 | 102, 108 | 14 |
| 1250 | 11 | 72 | 8 |
| 1250 | 11 | 78, 84 | 10 |
| 1250 | 12 | 90, 96 | 12 |
| 1250 | 12 | 102, 108 | 14 |
| 1600 | 12 | 84, 90 | 10 |
| 1600 | 12 | 96, 102 | 12 |
| 1600 | 12 | 108 | 14 |
| 2000 | 12 | 90 | 10 |
| 2000 | 12 | 96, 102 | 12 |
| 2000 | 12 | 108 | 14 |

### DOUBLE ACTION—SINGLE & MULTIPLE POINT

| CAPACITY, TONS Outer Ram | CAPACITY, TONS Inner Ram | BOLSTER PLATE Thickness | BOLSTER PLATE Depth | Rows of Holes |
|---|---|---|---|---|
| SINGLE POINT | | | | |
| 125 | 250 | 7 | 42 | 4 |
| 150 | 300 | 7½ | 42 | 4 |
| 200 | 400 | 8 | 54 | 6 |
| 250 | 500 | 8½ | 54 | 6 |
| 300 | 600 | 9 | 66 | 8 |
| 400 | 800 | 11 | 66 | 8 |
| 500 | 1000 | 11 | 66 | 8 |
| 625 | 1250 | 12 | 78 | 8 |
| 800 | 1600 | 12 | 78 | 8 |
| 1000 | 2000 | 12 | 78 | 8 |
| MULTIPLE POINT | | | | |
| 125 | 250 | 6½ | 48 | 6 |
| 125 | 250 | 6½ | 60 | 8 |
| 150 | 250 | 7 | 60 | 8 |
| 175 | 300 | 7½ | 48 | 6 |
| 175 | 300 | 7½ | 60 | 8 |
| 175 | 300 | 8 | 72 | 10 |
| 225 | 400 | 8 | 48 | 4 |
| 225 | 400 | 8 | 60 | 6 |
| 225 | 400 | 9½ | 72 | 8 |
| 225 | 400 | 9½ | 84 | 10 |
| 350 | 600 | 9 | 60 | 6 |
| 350 | 600 | 11 | 72 | 8 |
| 350 | 600 | 11 | 84 | 10 |
| 350 | 600 | 12 | 96 | 12 |
| 350 | 600 | 12 | 108 | 14 |
| 500 | 800 | 11 | 60 | 6 |
| 500 | 800 | 12 | 72 | 8 |
| 500 | 800 | 12 | 84 | 10 |
| 500 | 800 | 12 | 96 | 12 |
| 500 | 800 | 12 | 108 | 14 |
| 600 | 1000 | 12 | 72 | 8 |
| 600 | 1000 | 12 | 84 | 10 |
| 600 | 1000 | 12 | 96 | 12 |
| 600 | 1000 | 12 | 108 | 14 |
| 700 | 1250 | 12 | 72 | 8 |
| 700 | 1250 | 12 | 84 | 10 |
| 700 | 1250 | 12 | 96 | 12 |
| 700 | 1250 | 12 | 108 | 14 |
| 900 | 1600 | 12 | 108 | 14 |

### BOLSTER PLATE MATERIALS

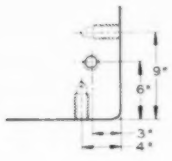
**Steel bolster plates:** SAE 1020 steel.

**Cast-iron bolster plates:** Chemical composition — 3.35 to 3.50% total carbon, 0.70 to 1.00% silicon, 0.70 to 1.00% manganese, 0.30 to 0.50% chromium, 0.13% sulphur and 0.15% phosphorus. Brinell hardness: 166-217. The cast iron used in bolster plates should be free from excessively large graphite flakes and should have uniform machining properties. Bolster plates are not generally stress relieved after rough machining.

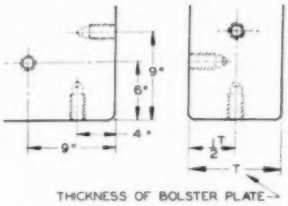
†Applies to 72 x 12 and 84 x 12 press sizes.

# Bolster Plate Details ... Continued

## HOLES FOR MOUNTING HANDLING HOOKS




This hole arrangement for:
48 x 60 Single Action
36 x 42 Double Action
48 x 54 Double Action



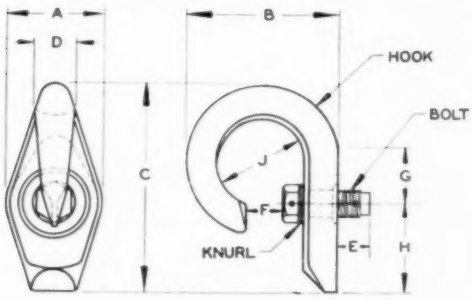

This hole arrangement for single- and double-action presses of all other standard sizes

**HOLE SIZES FOR BOLSTER PLATES**

| SINGLE ACTION L TO R | DOUBLE ACTION L TO R | TAPPED HOLE CLASS 3 |
|---|---|---|
| 48- 60- 72 | 36- 48- 60- 72 | ¾-10 |
| 84- 96-108-120 | 84- 96-108-120 | 1 -8 |
| 132-144-156 | 132-144-156 | 1¼-7 |
| 180-204-228 | 180-204-228 | 1½-6 |

Depth of tapped hole equals 2½ times the diameter of thread.

## HANDLING HOOK



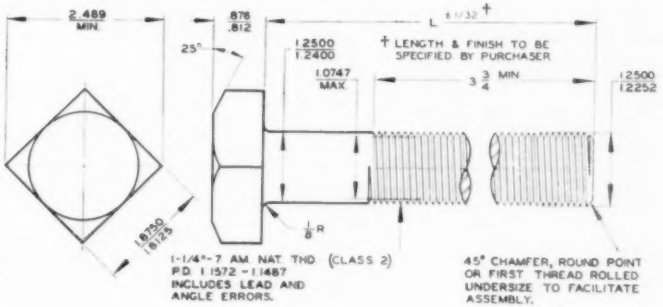

### GENERAL SPECIFICATIONS

**A closed-die drop forging** of SAE 3310 steel, fine grain, is satisfactory for handling hooks. Each hook should be inspected by the fluorescent magnetic-particle method to ascertain its freedom from laps, seams or other surface defects. Forgings should be heat-treated to Brinell 186-241. When loaded vertically (parallel to bolt) the hook must not show permanent set at a proof load of three times the rated lifting capacity, and must start to take permanent set at four times rated capacity. If dimension *F* increases ⅛ in. for the 3-ton hook, 5/32 in. for the 6-ton hook, 3/16 in. for the 9-ton hook and ¼ in. for the 15-ton hook, *after use*, the hook or hooks should be returned to the supplier for retreatment and test.

**Bolts for handling hooks** should have a yield strength in tension of not less than 130,000 psi. and an ultimate strength of not less than 149,500 psi. These bolts should be made of fine-grain steel, and be quenched in oil to Brinell 302-352.

| RATED LIFTING CAPACITY IN TONS | BOLT DIA. | BOLT THREAD | PITCH DIAMETER | | GENERAL DIMENSIONS | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | MIN. | MAX. | A | B | C | D | E | F | G | H | |
| 3 | 3/4 | 10-NC-3 | .6805 | .6850 | 3 | 5-1/8 | 7-5/16 | 1-1/8 | 1-3/8 | 1-3/8 | 2-3/4 | 2-7/8 | 3 |
| 6 | 1 | 8-NC-3 | .9134 | .9188 | 3-1/2 | 6-5/8 | 9 | 1-1/2 | 1-3/4 | 1-5/8 | 3-1/2 | 3-1/2 | 3-1/2 |
| 9 | 1-1/4 | 7-NC-3 | 1.1513 | 1.1572 | 4 | 8 | 10-9/16 | 2 | 2-1/16 | 2 | 4-1/4 | 4 | 4 |
| 15 | 1-1/2 | 6-NC-3 | 1.3846 | 1.3917 | 4-1/2 | 9-1/2 | 12-1/8 | 2-1/2 | 2-1/2 | 2 | 4-3/4 | 4-1/2 | 4-1/2 |

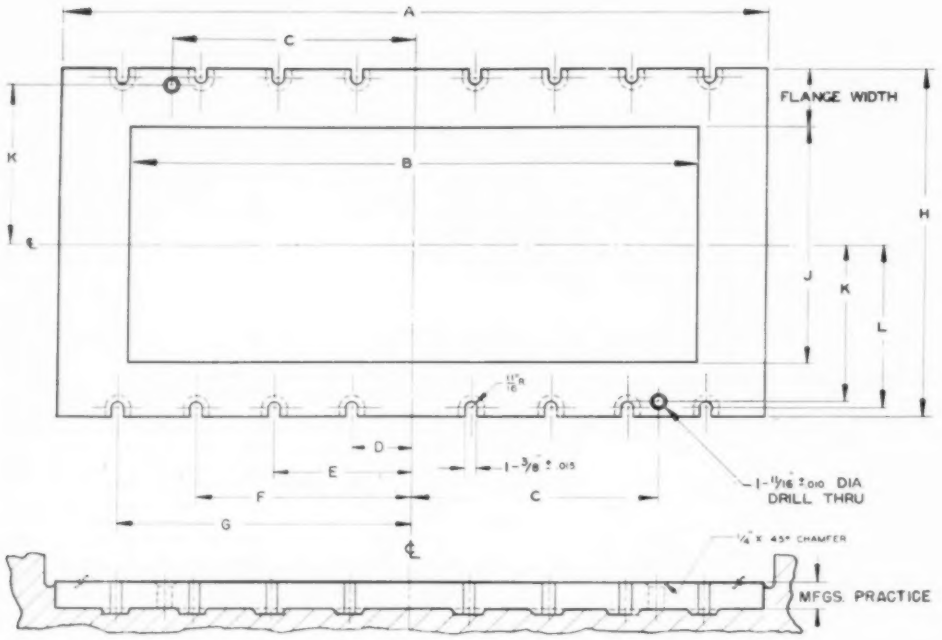
## MOUNTING BOLT




**Material:** Fine-grain steel, oil quenched to Brinell 302-352. Minimum yield strength in tension, 130,000 psi.; ultimate strength, 149,500 psi.

# PRESS-BED DIMENSIONS

## SINGLE-ACTION, MULTIPLE-POINT PRESSES




NOTES:

1. RIBS, IF ADDED, SHALL BE OF A WIDTH AND SO SPACED THAT THEY WILL NOT INTERFERE WITH THE PRESSURE PINS.
2. SHUT HEIGHT SHALL BE MEASURED FROM THE BED OF THE PRESS WITH THE ADJUSTMENT UP AND STROKE DOWN.

## DIMENSIONS OF THE BED, BED OPENING, LOCATING-PIN HOLES

### and spacing of the mounting slots

| LEFT TO RIGHT | | | | | | | FRONT TO BACK | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| A | B | C | D | E | F | G | H | J | WIDTH OF FLANGE | DISTANCE FROM BED OPENING TO INSIDE OF SLOT | K | L | RANGE OF TONNAGES † |
| ± 1/4 | Min. | ± .015 | ± .032 | ± .032 | ± .032 | ± .032 | ± 1/4 | | | | ± .015 | ± .032 | Min. | Max. |
| | | | | | | | 30 | 21 | 4-1/2 | 2-9/16 | 12-3/4 | 13-3/4 | 50 | 125 |
| | | | | | | | 36 | 27 | 4-1/2 | 2-9/16 | 15-3/4 | 16-3/4 | 75 | 125 |
| 48 | 33 | 9 | 15 | - | - | - | 36 | 21 | 7-1/2 | 5-9/16 | 15-3/4 | 16-3/4 | 150 | 200 |
| | | | | | | | 42 | 33 | 4-1/2 | 2-9/16 | 18-3/4 | 19-3/4 | 100 | 125 |
| | | | | | | | 42 | 27 | 7-1/2 | 5-9/16 | 18-3/4 | 19-3/4 | 150 | 250 |
| | | | | | | | 48 | 33 | 7-1/2 | 5-9/16 | 21-3/4 | 22-3/4 | 150 | 250 |
| | | | | | | | 30 | 21 | 4-1/2 | 2-9/16 | 12-3/4 | 13-3/4 | 50 | 125 |
| | | | | | | | 36 | 27 | 4-1/2 | 2-9/16 | 15-3/4 | 16-3/4 | 75 | 125 |
| | | | | | | | 36 | 21 | 7-1/2 | 5-9/16 | 15-3/4 | 16-3/4 | 150 | 200 |
| 60 | 45 | 15 | 21 | - | - | - | 42 | 33 | 4-1/2 | 2-9/16 | 18-3/4 | 19-3/4 | 100 | 125 |
| | | | | | | | 42 | 27 | 7-1/2 | 5-9/16 | 18-3/4 | 19-3/4 | 150 | 250 |
| | | | | | | | 48 | 33 | 7-1/2 | 5-9/16 | 21-3/4 | 22-3/4 | 150 | 300 |
| | | | | | | | 54 | 39 | 7-1/2 | 5-9/16 | 24-3/4 | 25-3/4 | 200 | 300 |
| | | | | | | | 60 | 45 | 7-1/2 | 5-9/16 | 27-3/4 | 28-3/4 | 250 | 300 |
| | | | | | | | 36 | 21 | 7-1/2 | 5-9/16 | 15-3/4 | 16-3/4 | 75 | 200 |
| | | | | | | | 42 | 27 | 7-1/2 | 5-9/16 | 18-3/4 | 19-3/4 | 100 | 250 |
| | | | | | | | 48 | 33 | 7-1/2 | 5-9/16 | 21-3/4 | 22-3/4 | 150 | 300 |
| 72 | 57 | 21 | 9 | 27 | - | - | 54 | 39 | 7-1/2 | 5-9/16 | 24-3/4 | 25-3/4 | 200 | 300 |
| | | | | | | | 54 | 33 | 10-1/2 | 8-9/16 | 24-3/4 | 25-3/4 | 400 | 500 |
| | | | | | | | 60 | 45 | 7-1/2 | 5-9/16 | 27-3/4 | 28-3/4 | 250 | 300 |
| | | | | | | | 60 | 39 | 10-1/2 | 8-9/16 | 27-3/4 | 28-3/4 | 400 | 500 |

† For increments, see opposite page

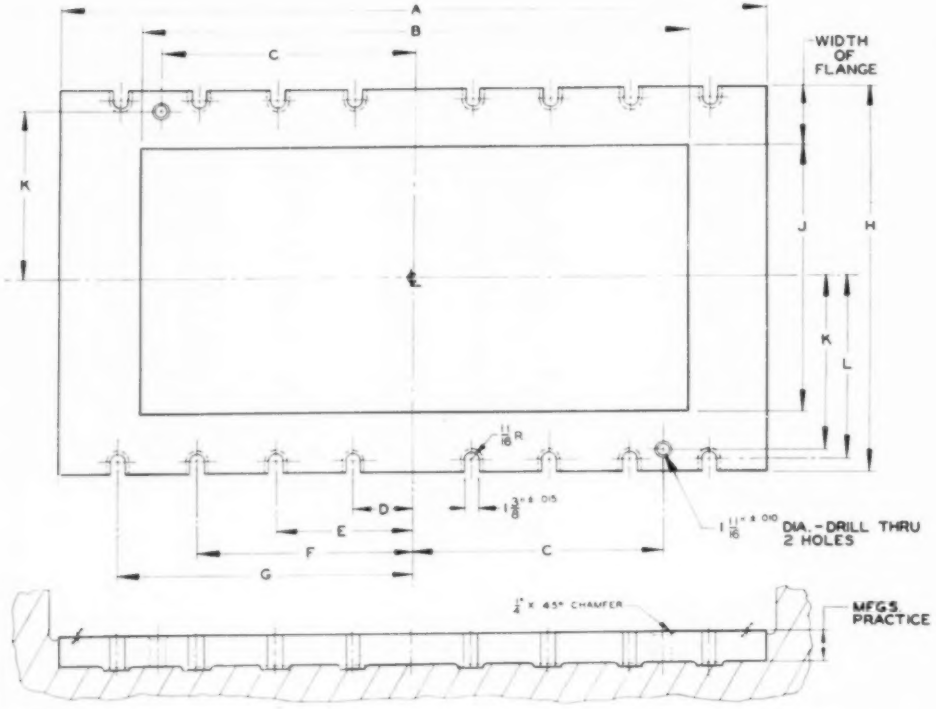
| LEFT TO RIGHT | | | | | | | FRONT TO BACK | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| A | B | C | D | E | F | G | H | J | WIDTH OF FLANGE | DISTANCE FROM BED OPENING TO INSIDE OF SLOT | K | L | RANGE OF † TONNAGES | |
| ± 1/4 | Min. | ±.015 | ±.032 | ±.032 | ±.032 | ±.032 | ± 1/4 | | | | ±.015 | ±.032 | Min. | Max. |
| 84 | 69 | 27 | 9 | 33 | - | - | 36 | 21 | 7-1/2 | 5-9/16 | 15-3/4 | 16-3/4 | 75 | 200 |
| | | | | | | | 42 | 27 | 7-1/2 | 5-9/16 | 18-3/4 | 19-3/4 | 100 | 250 |
| | | | | | | | 48 | 33 | 7-1/2 | 5-9/16 | 21-3/4 | 22-3/4 | 150 | 300 |
| | | | | | | | 54 | 39 | 7-1/2 | 5-9/16 | 24-3/4 | 25-3/4 | 200 | 300 |
| | | | | | | | 54 | 33 | 10-1/2 | 8-9/16 | 24-3/4 | 25-3/4 | 400 | 500 |
| | | | | | | | 60 | 45 | 7-1/2 | 5-9/16 | 27-3/4 | 28-3/4 | 250 | 300 |
| | | | | | | | 60 | 39 | 10-1/2 | 8-9/16 | 27-3/4 | 28-3/4 | 400 | 600 |
| | | | | | | | 66 | 51 | 7-1/2 | 5-9/16 | 30-3/4 | 31-3/4 | 250 | 300 |
| | | | | | | | 66 | 45 | 10-1/2 | 8-9/16 | 30-3/4 | 31-3/4 | 400 | 600 |
| | | | | | | | 72 | 51 | 10-1/2 | 8-9/16 | 33-3/4 | 34-3/4 | 400 | 600 |
| 96 | 81 | 33 | 9 | 39 | - | - | 48 | 33 | 7-1/2 | 5-9/16 | 21-3/4 | 22-3/4 | 150 | 300 |
| | | | | | | | 54 | 39 | 7-1/2 | 5-9/16 | 24-3/4 | 25-3/4 | 200 | 300 |
| | | | | | | | 54 | 33 | 10-1/2 | 8-9/16 | 24-3/4 | 25-3/4 | 400 | 500 |
| | | | | | | | 60 | 45 | 7-1/2 | 5-9/16 | 27-3/4 | 28-3/4 | 250 | 300 |
| | | | | | | | 60 | 39 | 10-1/2 | 8-9/16 | 27-3/4 | 28-3/4 | 400 | 800 |
| | | | | | | | 66 | 51 | 7-1/2 | 5-9/16 | 30-3/4 | 31-3/4 | 250 | 300 |
| | | | | | | | 66 | 45 | 10-1/2 | 8-9/16 | 30-3/4 | 31-3/4 | 400 | 800 |
| | | | | | | | 72 | 51 | 10-1/2 | 8-9/16 | 33-3/4 | 34-3/4 | 400 | 800 |
| 108 | 93 | 39 | 9 | 45 | - | - | 48 | 33 | 7-1/2 | 5-9/16 | 21-3/4 | 22-3/4 | 150 | 300 |
| | | | | | | | 54 | 39 | 7-1/2 | 5-9/16 | 24-3/4 | 25-3/4 | 200 | 300 |
| | | | | | | | 54 | 33 | 10-1/2 | 8-9/16 | 24-3/4 | 25-3/4 | 400 | 500 |
| | | | | | | | 60 | 45 | 7-1/2 | 5-9/16 | 27-3/4 | 28-3/4 | 250 | 300 |
| | | | | | | | 60 | 39 | 10-1/2 | 8-9/16 | 27-3/4 | 28-3/4 | 400 | 800 |
| | | | | | | | 66 | 51 | 7-1/2 | 5-9/16 | 30-3/4 | 31-3/4 | 250 | 300 |
| | | | | | | | 66 | 45 | 10-1/2 | 8-9/16 | 30-3/4 | 31-3/4 | 400 | 800 |
| | | | | | | | 72 | 51 | 10-1/2 | 8-9/16 | 33-3/4 | 34-3/4 | 400 | 1250 |
| | | | | | | | 78 | 57 | 10-1/2 | 8-9/16 | 36-3/4 | 37-3/4 | 400 | 1250 |
| | | | | | | | 84 | 63 | 10-1/2 | 8-9/16 | 39-3/4 | 40-3/4 | 500 | 1250 |
| 120 | 105 | 45 | 9 | 27 | 51 | - | 60 | 45 | 7-1/2 | 5-9/16 | 27-3/4 | 28-3/4 | 250 | 300 |
| | | | | | | | 60 | 39 | 10-1/2 | 8-9/16 | 27-3/4 | 28-3/4 | 400 | 800 |
| | | | | | | | 66 | 51 | 7-1/2 | 5-9/16 | 30-3/4 | 31-3/4 | 250 | 300 |
| | | | | | | | 66 | 45 | 10-1/2 | 8-9/16 | 30-3/4 | 31-3/4 | 400 | 800 |
| | | | | | | | 72 | 51 | 10-1/2 | 8-9/16 | 33-3/4 | 34-3/4 | 400 | 1250 |
| | | | | | | | 78 | 57 | 10-1/2 | 8-9/16 | 36-3/4 | 37-3/4 | 400 | 1250 |
| | | | | | | | 84 | 63 | 10-1/2 | 8-9/16 | 39-3/4 | 40-3/4 | 500 | 1250 |
| 132 | 117 | 51 | 9 | 33 | 57 | - | 60 | 45 | 7-1/2 | 5-9/16 | 27-3/4 | 28-3/4 | 250 | 300 |
| | | | | | | | 60 | 39 | 10-1/2 | 8-9/16 | 27-3/4 | 28-3/4 | 400 | 800 |
| | | | | | | | 66 | 51 | 7-1/2 | 5-9/16 | 30-3/4 | 31-3/4 | 250 | 300 |
| | | | | | | | 66 | 45 | 10-1/2 | 8-9/16 | 30-3/4 | 31-3/4 | 400 | 800 |
| | | | | | | | 72 | 51 | 10-1/2 | 8-9/16 | 33-3/4 | 34-3/4 | 400 | 1250 |
| | | | | | | | 78 | 57 | 10-1/2 | 8-9/16 | 36-3/4 | 37-3/4 | 400 | 1250 |
| | | | | | | | 84 | 63 | 10-1/2 | 8-9/16 | 39-3/4 | 40-3/4 | 500 | 1250 |
| | | | | | | | 90 | 69 | 10-1/2 | 8-9/16 | 42-3/4 | 43-3/4 | 500 | 1250 |
| | | | | | | | 96 | 75 | 10-1/2 | 8-9/16 | 45-3/4 | 46-3/4 | 500 | 1250 |
| 144 | 129 | 57 | 9 | 33 | 63 | - | 72 | 51 | 10-1/2 | 8-9/16 | 33-3/4 | 34-3/4 | 400 | 1250 |
| | | | | | | | 78 | 57 | 10-1/2 | 8-9/16 | 36-3/4 | 37-3/4 | 400 | 1250 |
| | | | | | | | 84 | 63 | 10-1/2 | 8-9/16 | 39-3/4 | 40-3/4 | 500 | 1250 |
| | | | | | | | 90 | 69 | 10-1/2 | 8-9/16 | 42-3/4 | 43-3/4 | 500 | 1250 |
| | | | | | | | 90 | 63 | 13-1/2 | 11-9/16 | 42-3/4 | 43-3/4 | 1600 | 2000 |
| | | | | | | | 96 | 75 | 10-1/2 | 8-9/16 | 45-3/4 | 46-3/4 | 500 | 1250 |
| | | | | | | | 96 | 69 | 13-1/2 | 11-9/16 | 45-3/4 | 46-3/4 | 1600 | 2000 |
| 156 | 141 | 63 | 9 | 39 | 69 | - | 72 | 51 | 10-1/2 | 8-9/16 | 33-3/4 | 34-3/4 | 400 | 1250 |
| | | | | | | | 78 | 57 | 10-1/2 | 8-9/16 | 36-3/4 | 37-3/4 | 400 | 1250 |
| | | | | | | | 84 | 63 | 10-1/2 | 8-9/16 | 39-3/4 | 40-3/4 | 500 | 1250 |
| | | | | | | | 90 | 69 | 10-1/2 | 8-9/16 | 42-3/4 | 43-3/4 | 500 | 1250 |
| | | | | | | | 90 | 63 | 13-1/2 | 11-9/16 | 42-3/4 | 43-3/4 | 1600 | 2000 |
| | | | | | | | 96 | 75 | 10-1/2 | 8-9/16 | 45-3/4 | 46-3/4 | 500 | 1250 |
| | | | | | | | 96 | 69 | 13-1/2 | 11-9/16 | 45-3/4 | 46-3/4 | 1600 | 2000 |
| | | | | | | | 102 | 81 | 10-1/2 | 8-9/16 | 48-3/4 | 49-3/4 | 500 | 1250 |
| | | | | | | | 102 | 75 | 13-1/2 | 11-9/16 | 48-3/4 | 49-3/4 | 1600 | 2000 |
| | | | | | | | 108 | 87 | 10-1/2 | 8-9/16 | 51-3/4 | 52-3/4 | 500 | 1250 |
| | | | | | | | 108 | 81 | 13-1/2 | 11-9/16 | 51-3/4 | 52-3/4 | 1600 | 2000 |
| 180 | 165 | 75 | 9 | 33 | 57 | 81 | 84 | 63 | 10-1/2 | 8-9/16 | 39-3/4 | 40-3/4 | 500 | 1250 |
| | | | | | | | 90 | 69 | 10-1/2 | 8-9/16 | 42-3/4 | 43-3/4 | 500 | 1250 |
| | | | | | | | 90 | 63 | 13-1/2 | 11-9/16 | 42-3/4 | 43-3/4 | 1600 | 2000 |
| | | | | | | | 96 | 75 | 10-1/2 | 8-9/16 | 45-3/4 | 46-3/4 | 500 | 1250 |
| | | | | | | | 96 | 69 | 13-1/2 | 11-9/16 | 45-3/4 | 46-3/4 | 1600 | 2000 |
| | | | | | | | 102 | 81 | 10-1/2 | 8-9/16 | 48-3/4 | 49-3/4 | 500 | 1250 |
| | | | | | | | 102 | 75 | 13-1/2 | 11-9/16 | 48-3/4 | 49-3/4 | 1600 | 2000 |
| | | | | | | | 108 | 87 | 10-1/2 | 8-9/16 | 51-3/4 | 52-3/4 | 500 | 1250 |
| | | | | | | | 108 | 81 | 13-1/2 | 11-9/16 | 51-3/4 | 52-3/4 | 1600 | 2000 |
| 204 | 189 | 87 | 9 | 33 | 63 | 93 | 96 | 75 | 10-1/2 | 8-9/16 | 45-3/4 | 46-3/4 | 500 | 1250 |
| | | | | | | | 96 | 69 | 13-1/2 | 11-9/16 | 45-3/4 | 46-3/4 | 1600 | 2000 |
| | | | | | | | 102 | 81 | 10-1/2 | 8-9/16 | 48-3/4 | 49-3/4 | 500 | 1250 |
| | | | | | | | 102 | 75 | 13-1/2 | 11-9/16 | 48-3/4 | 49-3/4 | 1600 | 2000 |
| | | | | | | | 108 | 87 | 10-1/2 | 8-9/16 | 51-3/4 | 52-3/4 | 500 | 1250 |
| | | | | | | | 108 | 81 | 13-1/2 | 11-9/16 | 51-3/4 | 52-3/4 | 1600 | 2000 |
| 228 | 213 | 99 | 9 | 45 | 75 | 105 | 96 | 75 | 10-1/2 | 8-9/16 | 45-3/4 | 46-3/4 | 1000 | 1250 |
| | | | | | | | 96 | 69 | 13-1/2 | 11-9/16 | 45-3/4 | 46-3/4 | 1600 | 2000 |
| | | | | | | | 102 | 81 | 10-1/2 | 8-9/16 | 48-3/4 | 49-3/4 | 1000 | 1250 |
| | | | | | | | 102 | 75 | 13-1/2 | 11-9/16 | 48-3/4 | 49-3/4 | 1600 | 2000 |
| | | | | | | | 108 | 87 | 10-1/2 | 8-9/16 | 51-3/4 | 52-3/4 | 1000 | 1250 |
| | | | | | | | 108 | 81 | 13-1/2 | 11-9/16 | 51-3/4 | 52-3/4 | 1600 | 2000 |

† INCREMENTS - TONS

| | |
|---|---|
| From 50 Tons to 150 Tons, Incl.: INCREMENT = 25 Tons | Above 1000 Tons to 1250 Tons, Incl.: INCREMENT = 250 Tons |
| Above 150 Tons to 300 Tons, Incl.: INCREMENT = 50 Tons | Above 1250 Tons to 1600 Tons, Incl.: INCREMENT = 350 Tons |
| Above 300 Tons to 600 Tons, Incl.: INCREMENT = 100 Tons | Above 1600 Tons to 2000 Tons, Incl.: INCREMENT = 400 Tons |
| Above 600 Tons to 1000 Tons, Incl.: INCREMENT = 200 Tons | |

# PRESS-BED DIMENSIONS... CONTINUED

## DOUBLE-ACTION, SINGLE- AND MULTIPLE-POINT PRESSES




NOTES:

1. RIBS, IF ADDED, SHALL BE OF A WIDTH AND SO SPACED THAT THEY WILL NOT INTERFERE WITH THE PRESSURE PINS.
2. SHUT HEIGHT SHALL BE MEASURED FROM THE BED OF THE PRESS WITH THE ADJUSTMENT UP AND STROKE DOWN.

*Single-point presses*

## DIMENSIONS OF BED, BED OPENING, LOCATING-PIN HOLES,

spacing of mounting slots, and capacities of outer and inner rams

| LEFT TO RIGHT | | | | | | | FRONT TO BACK | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| A | B | C | D | E | F | G | H | J | WIDTH OF FLANGE | K | L | CAPACITY IN TONS † | |
| ± 1/4 | Min. | ±.015 | ±.032 | ±.032 | ±.032 | ±.032 | ± 1/4 | | | ±.015 | ±.032 | OUTER RAM | INNER RAM |
| 36 | 27 | 9 | 14 | - | - | - | 42 | 27 | 7-1/2 | 18-3/4 | 19-3/4 | 125<br>150 | 250<br>300 |
| 48 | 40 | 9 | 15 | - | - | - | 54 | 33 | 10-1/2 | 24-3/4 | 25-3/4 | 200<br>250 | 400<br>500 |
| 60 | 52 | 15 | 21 | - | - | - | 66 | 45 | 10-1/2 | 30-3/4 | 31-3/4 | 300<br>400<br>500 | 600<br>800<br>1000 |
| 72 | 60 | 21 | 9 | 27 | - | - | 78 | 51 | 13-1/2 | 36-3/4 | 37-3/4 | 625<br>800<br>1000 | 1250<br>1600<br>2000 |

*Multiple-point presses*

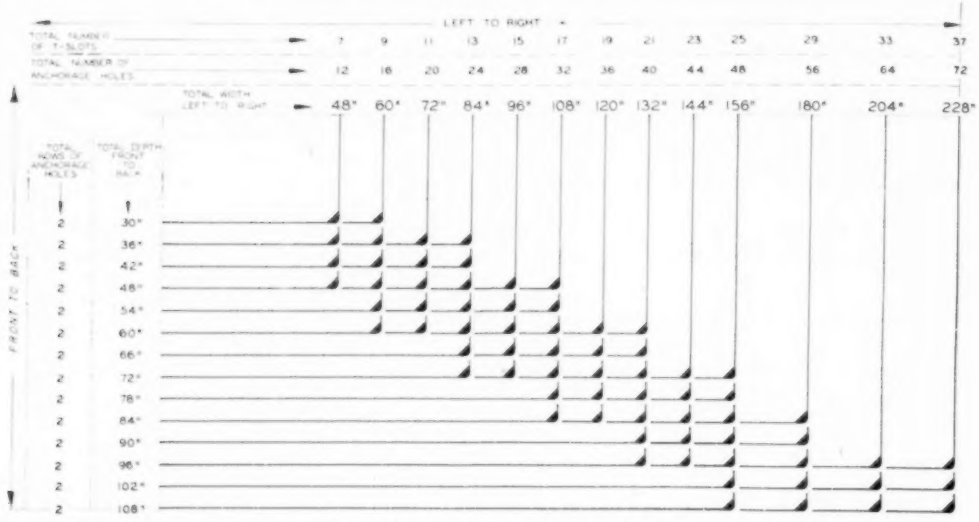
## DIMENSIONS OF BED, BED OPENING, LOCATING-PIN HOLES,

**spacing of mounting slots, and capacities of outer and inner rams**

| LEFT TO RIGHT | | | | | | | FRONT TO BACK | | | | | CAPACITY IN TONS † | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| A | B | C | D | E | F | G | H | J | WIDTH OF FLANGE | K | L | OUTER RAM | INNER RAM |
| ± 1/4 | Min. | ±.015 | ±.032 | ±.032 | ±.032 | ±.032 | ± 1/4 | | | ±.015 | ±.032 | | |
| 72 | 57 | 21 | 9 | 27 | - | - | 48 | 33 | 7-1/2 | 21-3/4 | 22-3/4 | 125 | 200 |
| | | | | | | | 60 | 45 | 7-1/2 | 27-3/4 | 28-3/4 | 125<br>150<br>175 | 200<br>250<br>300 |
| 84 | 69 | 27 | 9 | 33 | - | - | 48 | 33 | 7-1/2 | 21-3/4 | 22-3/4 | 175 | 300 |
| | | | | | | | 48 | 27 | 10-1/2 | 21-3/4 | 22-3/4 | 225 | 400 |
| | | | | | | | 60 | 45 | 7-1/2 | 27-3/4 | 28-3/4 | 175 | 300 |
| | | | | | | | 60 | 39 | 10-1/2 | 27-3/4 | 28-3/4 | 225 | 400 |
| 96 | 81 | 33 | 9 | 39 | - | - | 48 | 33 | 7-1/2 | 21-3/4 | 22-3/4 | 175 | 300 |
| | | | | | | | 48 | 27 | 10-1/2 | 21-3/4 | 22-3/4 | 225 | 400 |
| | | | | | | | 60 | 45 | 7-1/2 | 27-3/4 | 28-3/4 | 175 | 300 |
| | | | | | | | 60 | 39 | 10-1/2 | 27-3/4 | 28-3/4 | 225 | 400 |
| | | | | | | | 72 | 57 | 7-1/2 | 33-3/4 | 34-3/4 | 175 | 300 |
| | | | | | | | 72 | 51 | 10-1/2 | 33-3/4 | 34-3/4 | 225 | 400 |
| 108 | 93 | 39 | 9 | 45 | - | - | 60 | 39 | 10-1/2 | 27-3/4 | 28-3/4 | 225<br>350 | 400<br>600 |
| | | | | | | | 72 | 51 | 10-1/2 | 33-3/4 | 34-3/4 | 225<br>350 | 400<br>600 |
| 120 | 105 | 45 | 9 | 27 | 51 | - | 60 | 39 | 10-1/2 | 27-3/4 | 28-3/4 | 225<br>350<br>500 | 400<br>600<br>800 |
| | | | | | | | 72 | 51 | 10-1/2 | 33-3/4 | 34-3/4 | 225<br>350<br>500 | 400<br>600<br>800 |
| | | | | | | | 84 | 63 | 10-1/2 | 39-3/4 | 40-3/4 | 225<br>350<br>500 | 400<br>600<br>800 |
| 132 | 117 | 51 | 9 | 33 | 57 | - | 72 | 51 | 10-1/2 | 33-3/4 | 34-3/4 | 350<br>500<br>600 | 600<br>800<br>1000 |
| | | | | | | | 84 | 63 | 10-1/2 | 39-3/4 | 40-3/4 | 350<br>500<br>600 | 600<br>800<br>1000 |
| 144 | 129 | 57 | 9 | 33 | 63 | - | 72 | 51 | 10-1/2 | 33-3/4 | 34-3/4 | 350<br>500<br>600<br>700 | 600<br>800<br>1000<br>1250 |
| | | | | | | | 84 | 63 | 10-1/2 | 39-3/4 | 40-3/4 | 350<br>500<br>600<br>700 | 600<br>800<br>1000<br>1250 |
| | | | | | | | 96 | 75 | 10-1/2 | 45-3/4 | 46-3/4 | 350<br>500<br>600<br>700 | 600<br>800<br>1000<br>1250 |
| 156 | 141 | 63 | 9 | 39 | 69 | - | 84 | 63 | 10-1/2 | 39-3/4 | 40-3/4 | 350<br>500<br>600<br>700 | 600<br>800<br>1000<br>1250 |
| | | | | | | | 96 | 75 | 10-1/2 | 45-3/4 | 46-3/4 | 350<br>500<br>600<br>700 | 600<br>800<br>1000<br>1250 |
| 180 | 165 | 75 | 9 | 33 | 57 | 81 | 96 | 75 | 10-1/2 | 45-3/4 | 46-3/4 | 350<br>500<br>600<br>700 | 600<br>800<br>1000<br>1250 |
| | | | | | | | 108 | 87 | 10-1/2 | 51-3/4 | 52-3/4 | 350<br>500<br>600<br>700 | 600<br>800<br>1000<br>1250 |
| 204 | 189 | 87 | 9 | 33 | 63 | 93 | 108 | 87 | 10-1/2 | 51-3/4 | 52-3/4 | 500<br>600<br>700 | 800<br>1000<br>1250 |
| | | | | | | | 108 | 81 | 13-1/2 | 51-3/4 | 52-3/4 | 900 | 1600 |
| 228 | 213 | 99 | 9 | 45 | 75 | 105 | 108 | 81 | 13-1/2 | 51-3/4 | 52-3/4 | 900 | 1600 |

† DIFFERENT OUTER RAM AND INNER RAM TONNAGES FOR A GIVEN PRESS SIZE ARE DETERMINED ON THE BASIS OF BOLSTER PLATE THICKNESS, WIDTH OF FLANGE, ETC.

## RAM SIZES FOR SINGLE-ACTION, MULTIPLE-POINT PRESSES

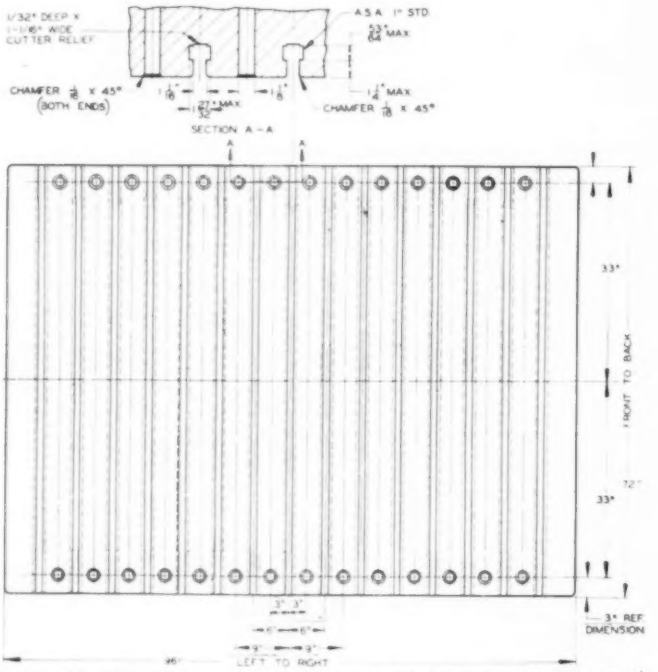

LEFT TO RIGHT
TOTAL NUMBER OF T-SLOTS
7 9 11 13 15 17 19 21 23 25 29 33 37
TOTAL NUMBER OF ANCHORAGE HOLES
12 16 20 24 28 32 36 40 44 48 56 64 72
TOTAL WIDTH LEFT TO RIGHT
48" 60" 72" 84" 96" 108" 120" 132" 144" 156" 180" 204" 228"
FRONT TO BACK
TOTAL NUMB OF ANCHORAGE HOLES
TOTAL DEPTH FRONT TO BACK
2 30"
2 36"
2 42"
2 48"
2 54"
2 60"
2 66"
2 72"
2 78"
2 84"
2 90"
2 96"
2 102"
2 108"

**Total number of T-slots** and anchorage holes left to right and total rows of anchorage holes front to back

### STANDARD STROKES

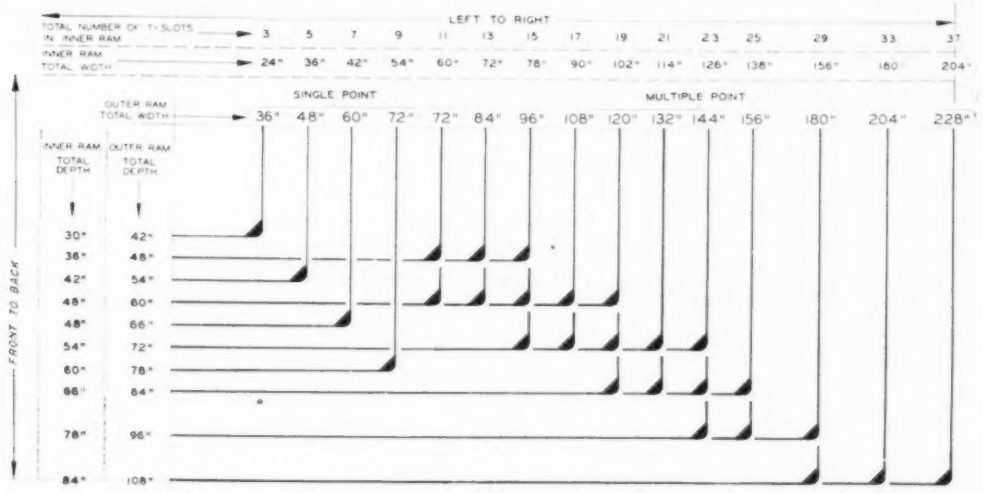
| PRESS CAPACITY TONS | STROKE IN |
|---|---|
| 50-75 | 4- 6- 8 |
| 100-125 | 4- 6- 8-10 |
| 150 | 4- 8-12 |
| 200 | 4- 8-12-16 |
| 250-300 | 8-12-16-20-24 |
| 400-500 | 8-12-16-20-24 |
| 600-800 | 12-16-20-24-28-32 |
| 1000-1250 | 16-20-24-28-32 |
| 1600-2000 | 16-20-24-28-32 |

T-slots start at the front-to-back centerline and progress sidewise at 6-in. intervals. Anchorage holes start 3 in. either side of the centerline and progress sidewise at 6-in. intervals. In both cases the dimension is always referenced to the centerline, and the tolerance is ±0.015 in.

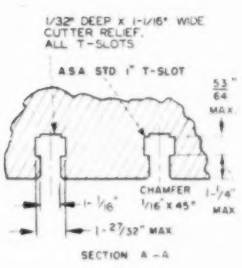


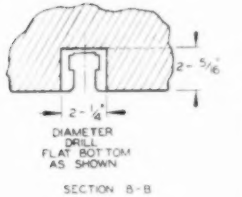

**Layout of typical ram**, showing uniform spacing of anchorage holes and T-slots

# RAM SIZES FOR DOUBLE-ACTION, SINGLE- & MULTIPLE-POINT PRESSES

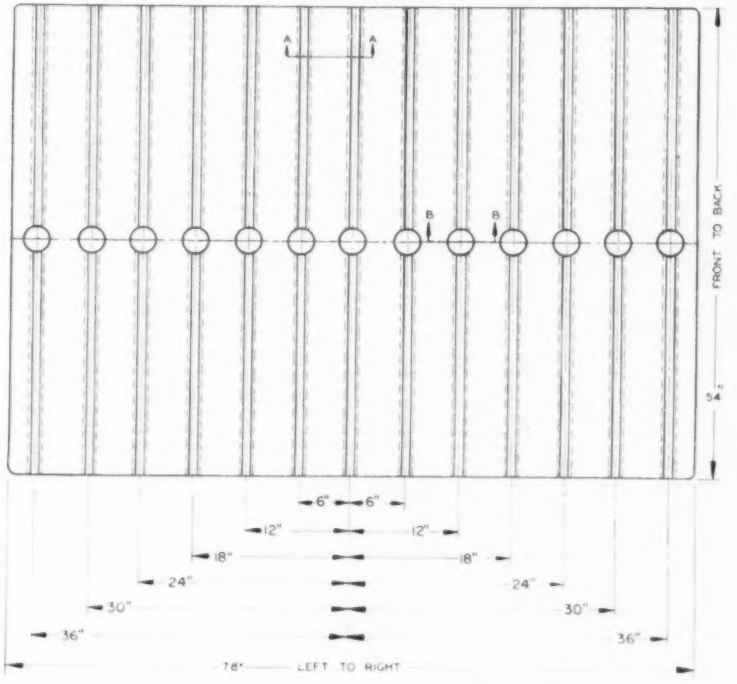

LEFT TO RIGHT
TOTAL NUMBER OF T-SLOTS IN INNER RAM
3 5 7 9 11 13 15 17 19 21 23 25 29 33 37
INNER RAM TOTAL WIDTH
24" 36" 42" 54" 60" 72" 78" 90" 102" 114" 126" 138" 156" 180" 204"
SINGLE POINT
MULTIPLE POINT
OUTER RAM TOTAL WIDTH
36" 48" 60" 72" 72" 84" 96" 108" 120" 132" 144" 156" 180" 204" 228"
INNER RAM TOTAL DEPTH
OUTER RAM TOTAL DEPTH
FRONT TO BACK
30" 42"
36" 48"
42" 54"
48" 60"
48" 66"
54" 72"
60" 78"
66" 84"
78" 96"
84" 108"

**Dimensions** of the outer and inner rams and the total number of T-slots in the inner ram



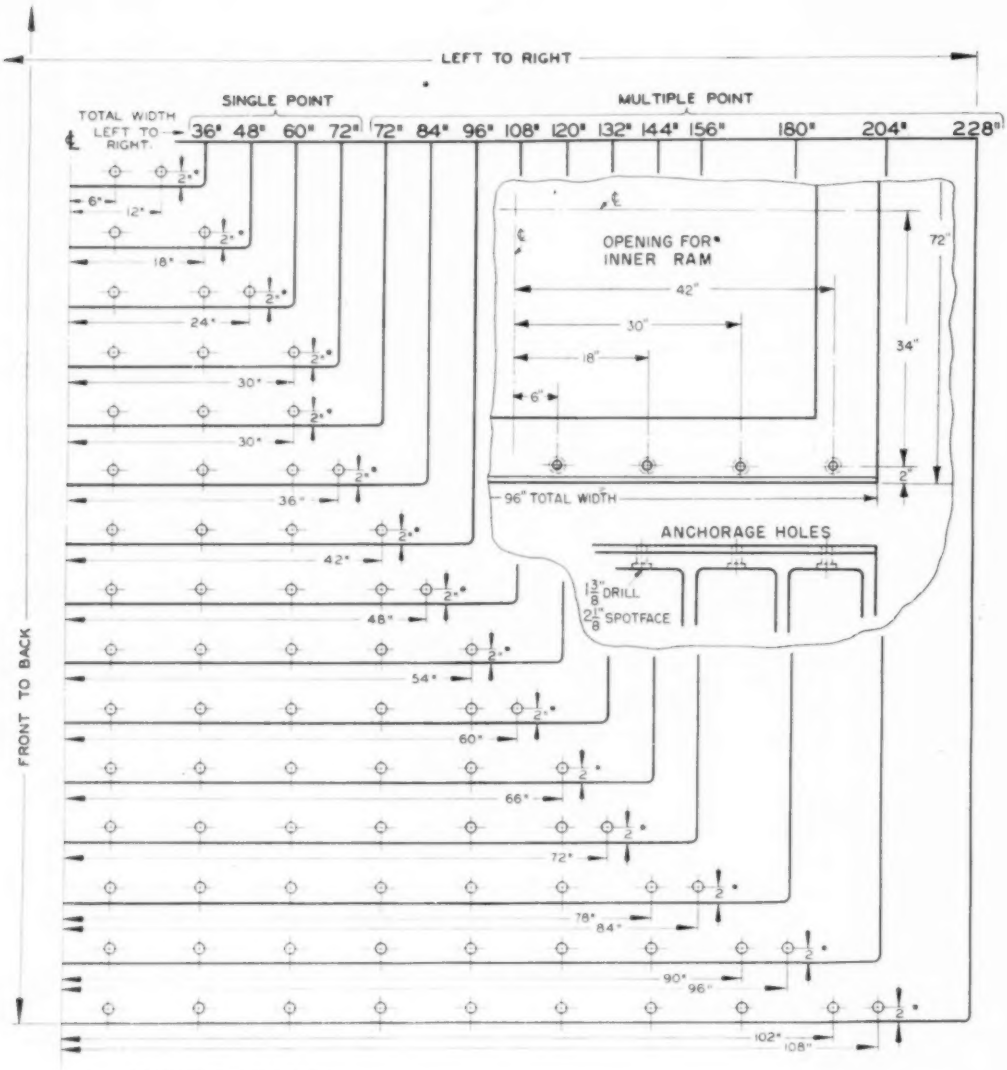

**T-slots** are spaced at 6 in. intervals, starting from the front-to-back centerline. Each slot is referenced to the centerline and the tolerance on the dimension is ±0.015 in.




**Layout of typical inner ram,** showing uniform spacing and size of the T-slots

# RAM DETAILS...CONTINUED

## OUTER RAMS FOR DOUBLE-ACTION AND MULTIPLE-POINT PRESSES, location and spacing of anchorage holes

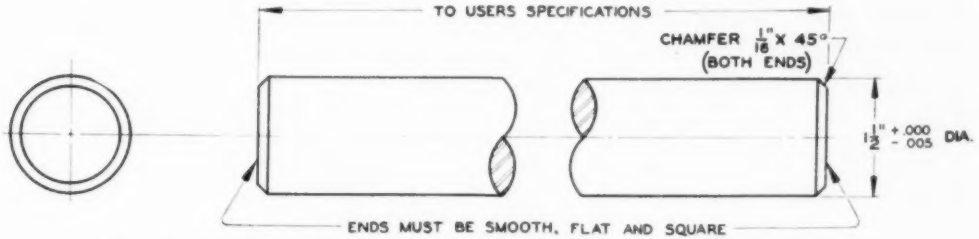



* REFERENCE DIMENSION ONLY

IMPORTANT: EACH ANCHORAGE HOLE IS MEASURED FROM THE LEFT TO RIGHT AND FRONT TO BACK CENTERLINES OF THE OUTER RAM WITHIN A TOLERANCE OF ± .015.

# PRESS-ROOM ACCESSORIES

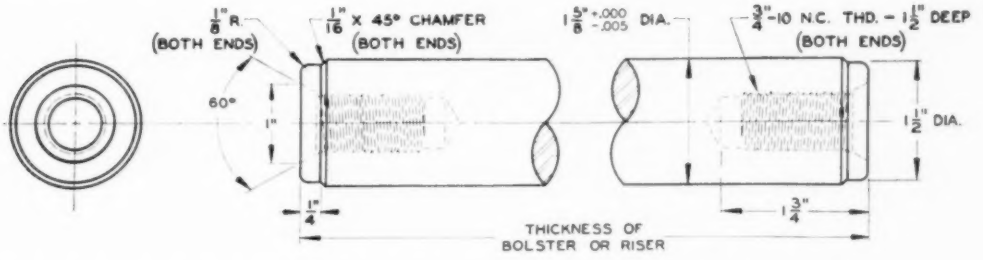
## PRESSURE PIN




**Material:** *For normal service*—SAE 1020 cold-drawn steel.

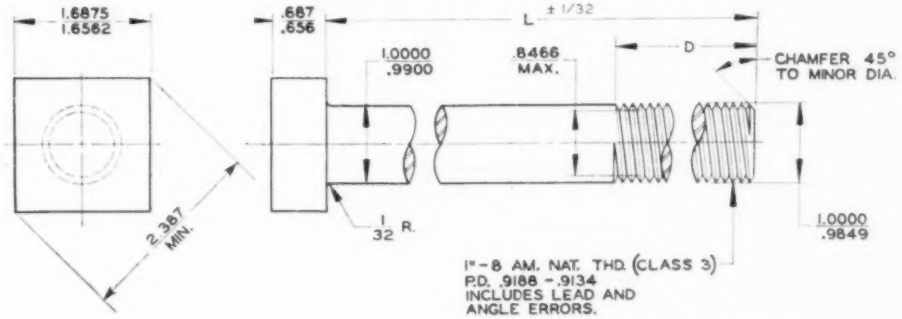
*For heavy-duty service*—SAE 1020 steel carburized 0.050 to 0.060 in. deep at 1650 to 1700 F., cooled in box, reheated to 1450 F, quenched in water, then tempered one hour at 350 F. This treatment should give a surface that is resistant to a file but tough to withstand shock.

## LOCATING PIN




Material: SAE 1020 cold-rolled steel, carburized and hardened. The ends must be smooth, flat and square.

## T-SLOT BOLT (1-IN. ASA STANDARD HEAD)




Length *L* should be 5, 7, 9, 11 or 13 in. Length *D* for a 9-in. bolt should be 2½ in. min., 2 11/16 in. max.
**Material:** Fine-grain steel, oil quenched and tempered to Brinell 302-352. Minimum yield strength, 130,000 psi.

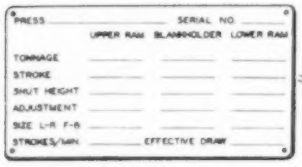
# STANDARD MARKING SYSTEM

## FOR IDENTIFYING PRESSES

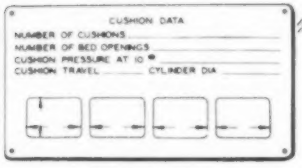
**At central position on front of press and visible from the floor:**

1. Action and points of suspension
2. Tonnage
3. Left to right dimension
4. Front to back dimension

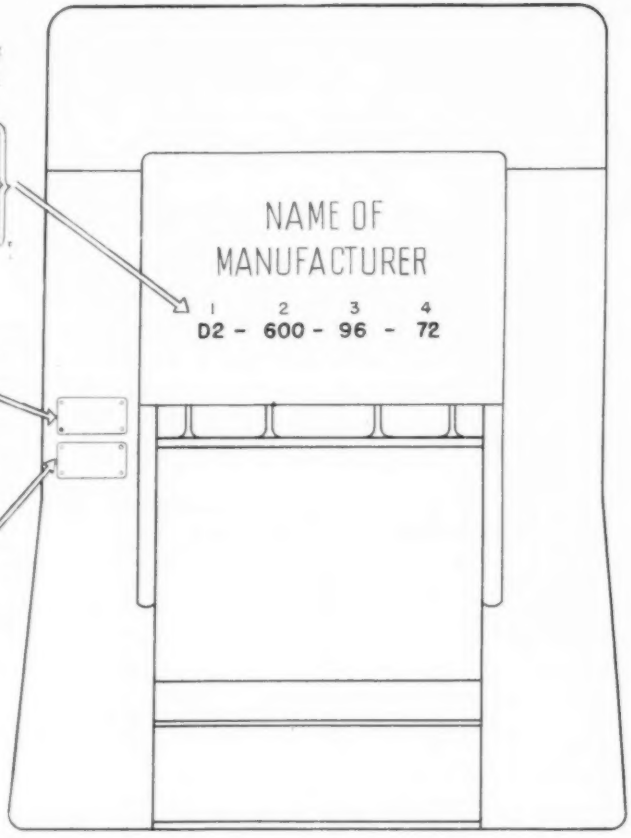
### SPECIFICATION TAGS




PRESS DATA




CUSHION DATA




## GENERAL SPECIFICATIONS FOR SINGLE-ACTION PRESSES

### Air Cushions

Means shall be provided by the press manufacturer to prevent the air pad from striking the bolster plate. The distance between the air pad and the bottom of the bolster plate shall equal ½ in., plus nothing minus ⅛ in. Through the range of motion of the pad, it must remain parallel to the bolster plate.

### Electrification of Presses

The electrification of presses shall be in accordance with the Electrical Standards for Industrial Equipment, as prepared by the Conference.

### Locating Pins in Press Bed

A removable stop or other means shall be provided in the bed of the press by the press manufacturer to prevent locating pins from dropping through bottom of the bed, and also to hold the pins so that they will not exceed a depth of 2 in. when placed in the bed of the press.

### Length of Gibs

Gibs shall equal the full length of the stroke of the ram, with the stroke down and the adjustment up.

### Knock-out Holes in Ram

Provision of knock-out holes in the ram and the amount of travel of knock-out bars shall be agreed upon by purchaser and press builder.

### Ribs in Press Bed

Ribs in the press bed, if added, shall be of a width and so spaced that they will not interfere with the pressure pin holes.

### Tonnage of Air Pad

The tonnage of the air pad shall equal one-sixth the press tonnage.

### Serial Number of Press

In addition to being shown on the specification tag for press data, the serial number of the press shall also be stamped on the column of the press, preferably beneath the tag.

### Shut Height

Shut height shall be measured from the bed of the press with the adjustment up and the stroke down.

### Wear Surface on Pressure Pad

Pressure pads having a hardened wear surface and guides for guiding the pressure pins shall be furnished by the press manufacturer.

# How to Abuse Machine Tools

**The chief engineer of a major machine-tool company, a man with over 30 years of experience in machine-tool design and operation, points out the mistreatment machines receive in too many plants**

SHE's getting a little noisy, and losing her pep," said the machine-tool engineer as he drove his '48 model into the garage for a little "going over". The mechanic took a glance at the car and said, "How long have you had it and about how many miles on it?"

"Had her only about six months and just about three thousand miles," the engineer answered. "Been pretty busy so haven't had time to have anything done to it. Why, that car hasn't been washed since the day I got it. No time for that. How often do I oil it? Seldom bother with that. Guess I did add some once. A friend told me that 'oil is oil', whether you pay 15 or 40 cents a quart, so I buy the cheap kind."

To the lecture he got from the mechanic, the engineer said, "Yes, I know all that, but I am usually too busy to bother. Did you say the caps on the battery were missing? I probably forgot to put them on when I took a look inside."

No, you wouldn't expect a machine-tool engineer to abuse his car like that, but if you substitute "machine tool" for "car" in the foregoing you will have a picture as to what is sometimes happening in industry today. It is not universal, but it is serious enough to cause concern on the part of the machine-tool builder and is something that saddens the heart of the machine-tool engineer.

A dirty machine tool is no more excusable than a dirty car. Yet in many plants the machines do not receive the same consideration that the executives' cars receive, even though they represent a far greater investment.

The reply you get when you inquire why the machines are so filthy is that the only time they can be cleaned is on Saturday and Sunday and that means overtime. "And we can't pay overtime for that." Would not improved morale, increased production, and the investment justify the added expense?

Another complaint the machine-tool engineer has is in regard to the use of the proper oil. Somebody in the user's plant said that machine oil was good enough for the hydraulic system and if an oil line broke and the oil ran on the floor you didn't lose so much money. In one case, heavy gear lubricant was put in the hydraulic system. But the customer expects the machine tool to function just as well with machine oil as with hydraulic oil. And if it doesn't, and naturally it will not, the machine-tool builder still has to produce "or else".

While on the subject of oil, we might mention the matter of lubrication. A machine tool, like an auto, needs the proper oil and grease at the proper intervals. Yet there have been cases where the machine has not received any lubrication. When it would not function any more the service man was called in—to find a dry gear case or dry bearings. Like an auto, machine tools need proper lubrication with the correct lubricants. You can't get good results without them.

There is also the customer who buys a special machine tool for a semi-finish or finish operation and then decides to do a heavy roughing operation on the same machine, thereby eliminating an operation. So instead of taking a 1/16-in. cut he is taking 7/16. The machine was designed to do a light operation and is not standing up under such punishment. Then the customer wonders why!

This customer's next of kin is the one who has a foreman who is not satisfied with the machine cycle. He wants to speed it up, so he turns this and that, hoping he will get what he wants, but not knowing what he is doing. What he does get is a machine that is out of time and adjustment and pounds itself to pieces. Then the builder gets a hurry-up call to do something about it, build the machine stronger or put in heavier parts that will stand up. To please the customer he does make heavier parts and installs them, at the same time setting the adjustments so the machine will function properly, and hoping the foreman will not get any more bright ideas without consulting the manufacturer or service man.

Leaving the caps off the car battery is no worse than leaving compartment and cabinet doors open on a machine tool so electric and hydraulic controls are covered with dirt, chips, and oil. And a machine tool is still supposed to function!

Those are just a few of the things a machine-tool engineer has to face in some of the manufacturing plants that use machine tools.

The machine-tool engineer is striving to produce machine tools of better design but he would also like to have the customer give his product decent treatment and care.

# ROUND TABLE

## Is Ignorance Bliss?

"Say, Ed, I got to thinking! Most of our men are pitifully ignorant of the workings of our products. They're making parts for something they never see or use when finished."

"They're not supposed to know about the product, Al. Their job is to get out the work that is assigned to them."

"You believe in the Stick-in-the-Mud philosophy," returned Al. "Now, for instance, let's take our new calculator B-6347, put in production about six months ago—how many of your men actually know how it works?"

"I doubt if any of them do," came back Ed. "All I know is that they know how to make the tools to manufacture it so that it will."

"Don't you think, Ed, that it would be a great boost to morale, as well as to the company, if all employees knew how the product which they produce works? Shouldn't we have a finished one on display here—and one in a window downtown?"

"I can't see what good that will do," frowned Ed; "It's the salesman's job to show it, and not to the men in the production line."

"That's where you're wrong, Ol' Timer," argued Al. "I can see many advantages in the employee being well up on the details of the product he is making. In the first place, he can brag a little to friends and relatives—that makes him feel good. Second, a man who thoroughly understands the workings of a mechanism is better able to figure where a little leeway will do no harm in the working of that product."

"The shop man has no say as to any leeway, Al. Our product is produced with absolute interchangeability of its parts. That's the engineers' responsibility—we can't tolerate any Tom, Dick, or Harry deciding what is and what is not good enough."

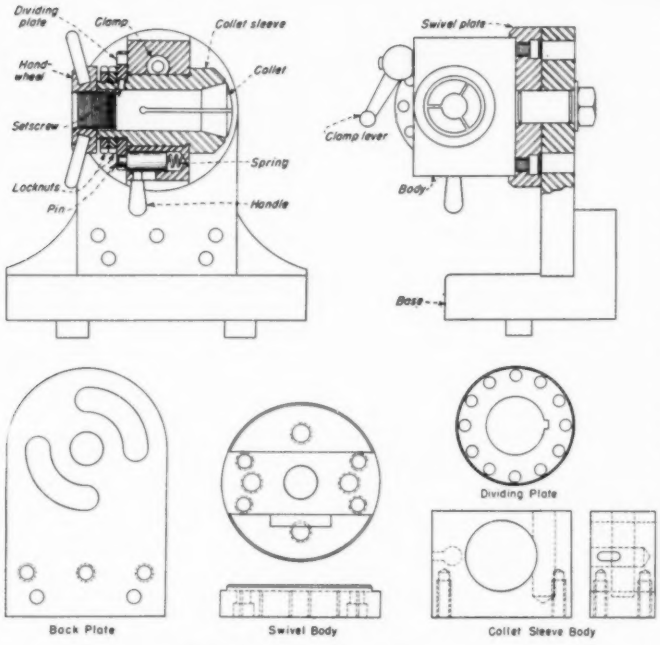
"You get me wrong, Ed; I don't mean the working limits as the part is originally designed," came back Al. "What I'm driving at is that a man who is in the know can be in a position to see where an improvement can be incorporated. You talk like 'Where ignorance is bliss, 'tis folly to be wise.' But I don't agree with that viewpoint—I say that to know is to be wiser."

"Ah, horsefeathers, Al, you've been reading too much Shakespeare—come down to earth."

"It seems earthy enough to me, Ed, to have a man who can save time and money do just that."

***SHOULD THE SHOP MAN** know all the details of what he is making? Will such knowledge help him to pitch in ideas—or just cause trouble? Your ideas and opinions on this subject will help others. Discussion of earlier topics appears on later pages.*

# Practical Ideas




## Compact Dividing Head Positions Small Work

MADE FOR SETUPS on small machine tables and in close quarters, the dividing head illustrated has twelve indexing positions, and the axis of the collet can be turned up 90° from horizontal to vertical. Standard collets of any make can be employed after a suitable collet sleeve has been made.

Collets are fitted in the hardened and ground sleeve which rides in the sleeve body—a rectangular block bored to size. The dividing plate is held against the shoulder of the body by two locknuts and is keyed to the sleeve by means of a setscrew threaded into a tapped hole in the sleeve before assembly.

The handwheel is assembled to the collet where it controls the compression of the jaws and also acts as a turning lever when the assembly is indexed into position.

A blind hole is drilled in the lower part of the body to take a pin attached to a handle. This pin is spring-loaded to slip into a hole in the dividing plate to hold it in an indexed position. The pin is pushed back by the operator to release the plate, and it snaps back into the next hole as the plate is rotated.

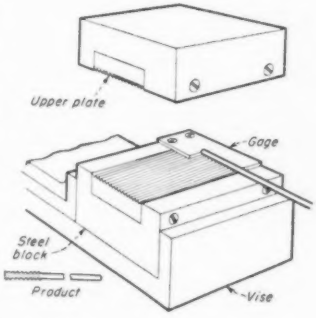
When stock is being loaded into the collet, the handwheel is backed off. A clamping rod, provided with a lever, is located in a hole intersecting the bore of the body. This rod is cut out where it touches the collet sleeve, and pressure on the lever puts pressure on the sleeve to hold it steady for the loading operation. The body is bolted to the swivel plate by four capscrews, and the swivel plate is held by a pin through it and the backplate and two large bolts which ride in curved slots. These slots allow rotating the assembly up to the vertical. Once a setup is made, these bolts are tightened.

The backplate is bolted firmly to a base by screws in recessed holes, and this is bolted or clamped to a machine table with or without T-slots in its surface. *C. Jaikens, Halifax, England.*

## Thread-Rolling Plates Mounted on Shaper

AS AN EMERGENCY MEASURE we rigged up our shaper to roll threads on the ends of small studs. The P & W thread-rolling plates were bolted in steel blocks, and one was mounted in the clapper box; the other in a vise on the shaper table.

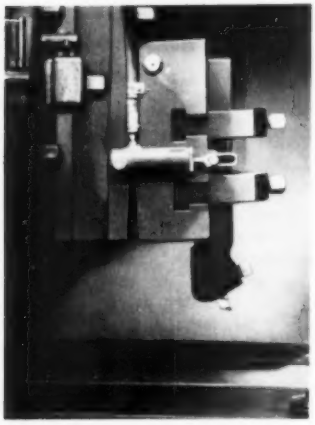
A gage plate of half the thickness of the stock was mounted on the bottom plate, near the rear, so the operator could locate the stock near the end of the backstroke. The shaper speed was set to allow this. The stroke of the machine was set at the length of both plates plus 1 in.




As the shaper head moved forward, the plates rolled the thread, and at the end of the stroke the work dropped off the front end of the lower plate into a pan. *E. C. Schlenker, Glendale, Cal.*

# Pneumatic Tool Lift Reduces Wear, Improves Operation

OUR 12-FT. PLANING MACHINE has been fitted with an air-operated tool lift for the last two years. The lift has an impressive number of advantages—it has saved 25% of normal tool wear, 10% in work time, made possible the use of tipped tools and improved finish on mild steel, aluminum and cast iron by 50%, increased accuracy on long cuts, and is economical to operate.



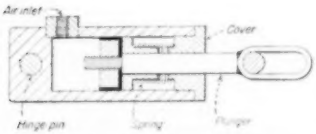
**Planer tool** in lifted position clears work. Vertical air line runs to valves at feed rack. Space between clapper and box indicates clearance and length of piston stroke required

An air cylinder is mounted on the slide of the machine by means of a hinge pin which permits it to rock. The spring-loaded plunger is fitted with a loop end which forces the tool out and up, and also allows some play in case of accidents. A single air inlet, admitting line air at 100 psi., is located in the top wall of the cylinder.

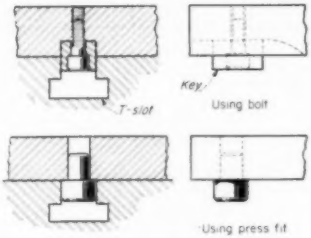
Two valves, inlet and outlet, are mounted on the machine in front of the feed rack and both feed directly to the air cylinder through a single line. Valve trips, made from nuts and bolts, are mounted on the feed rack in slotted (for adjustment) plates. On the cutting stroke the rack lifts up and the top trip contacts the exhaust valve to evacuate the cylinder. Spring pressure brings the tool smartly down to cutting position. On the return stroke, the other trip hits the inlet valve which fills the cylinder and forces the tool and mount out and up away from the work.

**Inlet and exhaust valves** are fixed to machine frame and are operated by rounded trips on planer feed rack

The clapper lifts smoothly and returns to position rapidly, and more than one tool can be operated with the same mechanism. The cylinder can easily be removed from one installation and changed to another. *R. J. Henkes, Mackenzie Bros., Sydney, Australia.*



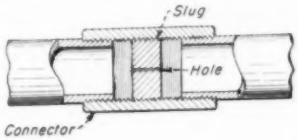

**Air cylinder** operates against pressure of compression spring. Short stud in piston is adjusted for closed position, allows clearance of inlet by plunger




## Pins Replace Keys In Fixture Bases

CONVENTIONALLY, fixtures are located on machine tables by means of machined keys that fit into T-slots for alignment. This method entails extra work as well as extra cost because the fixture must be milled and drilled and a special block or key must be made.

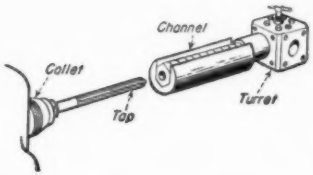
Instead of going through this work, the machinist can align his fixture by means of a simple turned pin that is driven with a press fit into a hole in the fixture. The shoulder of the pin is turned to a diameter the same as the width of the T-slot. A number can be made quickly from drill-rod stock. *Roger Isetts, Kenosha, Wis.*




## Drilled Plug Cuts Air Pressure

AIR-LINE HOSES used to blow chips off machine tables can be dangerous to the operator as well as to the machine because of flying chips. The pressure can be cut down to remove this danger to a great extent if a throttling plug is inserted in the line.

The line is cut, a threaded plug with a small hole through the axis is made, and it is assembled inside the connector that rejoins the line. A drill size from No. 40 to No. 60 can be used, depending upon the reduction desired. The plug should be about ¼ in. thick, and can fit loosely in the connector. *Bernard Levowich, Brookline, Mass.*

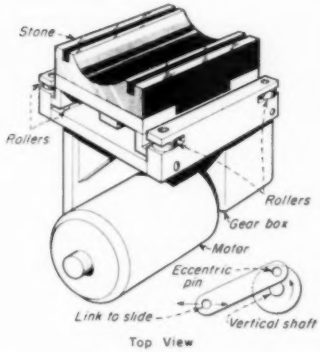



## Turret Lathe Taps Nuts

DRILLED NUTS are threaded rapidly with a channel fitted to the turret or a tailstock adapter of a lathe, and with a long tap chucked in the lathe collet.

The channel is made from bar stock, with one end turned to fit the turret. The channel is cut to hold the finished outside shapes of the nuts—it will allow lateral movement, but not twisting.

The tap is turned at a slow speed and the turret is fed toward the headstock slowly. This forces the tap into the holes in the nuts to thread them. When the tap has penetrated all the nuts, it is removed from the collet and the nuts are taken off. *T. W. V. Morgan, London, England.*




Top View

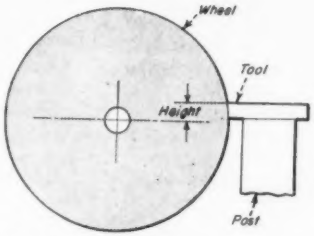
## Reciprocating Stone Laps and Superfinishes Lathe Work

THE ILLUSTRATED ATTACHMENT allows a lathe to be employed for lapping work. It can handle any work within the capacity of the machine providing the stone is ground to the correct diameter and is cut long enough.

Work to be superfinished is rotated by the lathe, and the stone is reciprocated by the motor acting through a gear box and an eccentric linkage. The gear box reduces the rotational speed from 1725 rpm. to 57 rpm., and changes the direction of the drive shaft from horizontal to vertical. The vertical shaft runs a plate with a pin set in it eccentrically, and a link connects to the slide under the stone.

A welded channel supports the motor, gear box and stone slide, and is fastened to the bed of the machine. Rollers under the slide and at the sides support and confine the slide. Since the throw of the eccentric is quite small, the rollers can be placed near the ends of the slide to provide the most stable support.

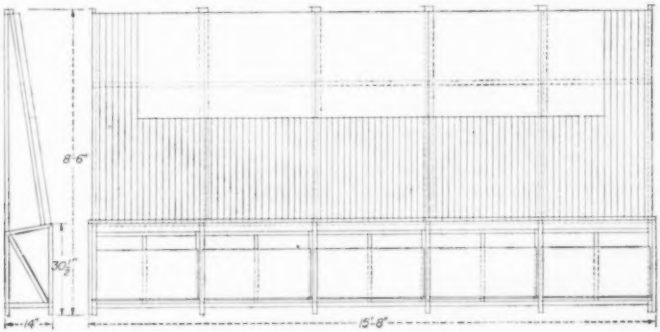
The length of shaft that can be finished in this manner depends upon the length of the stone and the throw of the eccentric, which does not have to be great. *Aaron H. Shum, Los Angeles, Cal.*




## Floor-Grinder Setup Cuts Front Clearance

FRONT CLEARANCE ANGLES can be ground on toolbits with a simple fixture made by raising the grinder post above the centerline of the wheel. For the common (for most toolbits) 8° angle, the post should be raised 0.07 times the diameter of the grinding wheel.

This setup will grind the 8° angle at the tip of the bit. If the bit has a deep section, the heel can be hand-ground to the approximate angle by comparison to the cutting tip of the bit. *Federico Strasser, Santiago de Chile.*

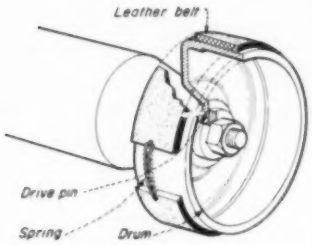



# Metal Rack Stacks Stock

THE PROBLEM of how to stock small quantities of many different sizes of round and strip metal, regardless of length, confronted me in our stock room supplying our instrument and repair shops. This rack made it easy for each worker to use the shortest practical piece of stock for his job without wasting time by hunting through a pile.

The rack is constructed with its base 30 in. from the floor. Stock is lined up vertically so the short pieces are just as convenient as the long ones, and therefore workers are not inclined to grab the nearest piece, regardless of how wasteful it may be.

I keep all rounds to the left of the rack, starting with the smallest size. Where desirable, brass and steel are placed in separate gutters. Strip metal is started from the right and graduates to the left in increasing sizes. *Harold J. Maurer, Cincinnati, O.*

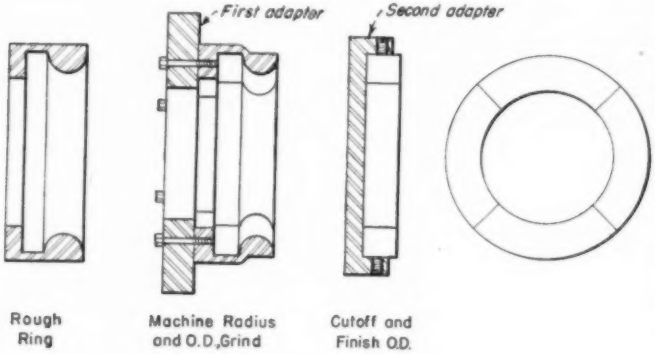



### Leather Strap Dampens Vibrations on Turning Job

RECENTLY we turned a large quantity of brake drums made from 3/16-in. drawn steel. The inside diameters had to be finished smooth for the brake linings.

The work could not be chucked externally because the clamping action of the chuck jaws distorted the shells out of round, the tool dug in, and chatter developed. We tried a number of methods before finally hitting upon this one: A piece of leather belting that was 3/16 in. thick and about 3 in. less in length than the circumference of the drums was strapped around a drum, which was bolted to a mandrel chucked in the lathe. A driving pin was sunk in the mandrel and this caught in a hole in the back face of the drum that was drilled for that purpose, but which did not damage the drum.

The belt was slipped on each drum as it was set up, and took up most of the vibration and dampened the tendency toward chattering. The drums were finished smoothly, and tool life was good. *Roger Isetts, Kenosha, Wis.*

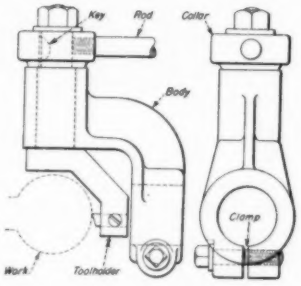



## Segmented Ring Machined And Ground in Adapters

ONE RING, made from SAE 1020 steel, with an internal radius and cut into four segments was required as an insert in molding work. Although the ring was simple enough as it appeared on the blueprint, it was complicated to make, especially because tolerances on diameters were to be within a thousandth, and the ends of the segments had to be accurate to two tenths.

Gages and form tools were first made, then the ring was rough machined from tubular stock. It was normalized, rough machined again, and then sawed into the segments with a thin blade. The mating edges were ground accurately so the sections fitted together.

Bolted into an adapter ring, the segments were machined outside and inside on a lathe, and another, smaller, adapter ring was mounted on the partly completed outside diameter. This was then mounted in the lathe, after the first adapter had been removed, and the extra stock was cut off and the ring was finish-machined. *F. Forquer, Buffalo, N. Y.*




### Tailstock-Mounting Fixture Cuts Balls and Radii

EXTERNAL RADII can be turned with accuracy with the illustrated fixture and toolholder. It is clamped to the tailstock spindle of a toolroom lathe.

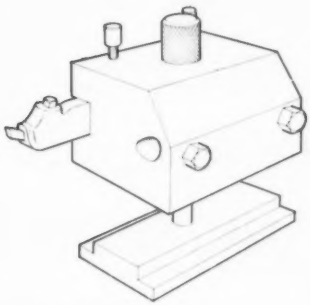
The body is made from a casting, with two holes bored at right angles to each other. The revolving toolholder is either cast or machined from solid stock, and is keyed to a simple rod-and-collar handle. A nut and washer assemble it to the body.

An adjustable head may be installed in place of the solid type shown, or a number of heads of different size may be employed. After the stock has been turned to the correct O.D. and the ball has been roughed out, the tool is set at the finished O.D. and light finishing cuts are made to produce a truly circular ball. *John Homewood, Ontario, Cal.*

### Piston Pins Made into Cutting Tools

END MILLS, spotfacers and counterbores of odd sizes can be made from piston (wrist or gudgeon) pins picked up at an auto shop. These pins range from ½ to 1 in. in diameter, and are made of oil-hardened steel.

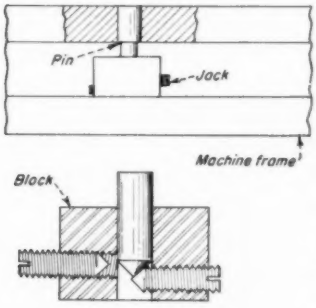
A mild-steel bar can be driven into one end of a pin, and the other end can be ground to form teeth. Outside diameters can be ground down to any size required by mounting the pins, which are usually hollow, on centers. Hardening is seldom necessary. *Dan J. Penway, Carlisle, England.*



## Toolblock Centers Boring Bar

A DUAL-PURPOSE toolblock made from a piece of 5x4x4-in. steel scrap is illustrated. Two setscrews hold a standard toolholder in a slot at one side of the block, and a boring bar is mounted in the hole, clamped by two large bolts. The shape of the boring-bar hole is such that bars with diameters from ½ in. to 1¼ in. will be held centered at the same height, regardless of diameter.

Blocks of this design are installed on a 16-in. lathe and four other lathes in our shop. *Ingvar Vik, Sydney, Mont.*

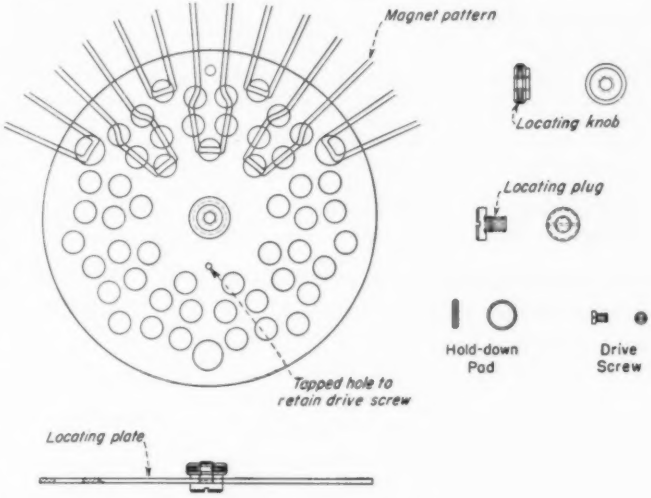



## Midget Jacks Raise Flush Pins

MACHINE-TOOL REPAIR and maintenance work often involves tearing down machines that were originally assembled with special tools and must be taken apart the same way. In dovetail ways and guide slots there are hardened pins that have been driven flush with the outer cast body. These pins usually are over narrow, cramped slots in which it is impossible to locate a normal tool.

Small but powerful jacks can be made from scrap stock to fit under the pins and force them out. The illustrated model can be varied, of course, to fit any requirements. The block is drilled vertically, and is drilled and tapped horizontally in two, three, or any number of spots, with the holes intersecting the vertical holes.

A pin with a tapered point on the bottom is set in the vertical hole, and setscrews with tapered points are turned into the tapped holes. These raise the pin by acting on the tapered point. More powerful action can be gained by turning the pin to an included angle of, say 120°, and by turning the setscrew points to included angles of 60°. If the tapped holes are placed one above the other, radiating around the block, powerful action can be maintained for a fairly large rise. *George Burnley, Oakland, Cal.*




## Fixture Plate Holds Small Parts on Grinding Table

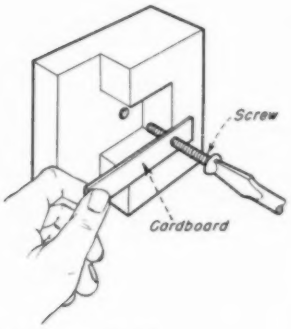
SURFACE-GRINDING small rings can be hazardous, even on a magnetic table, without a fixture. If one should pop up while being ground, the wheel might be damaged, the machine might be damaged, and most certainly a number of the rings would be ruined.

The plate fixture, while simple enough to make, holds the parts directly over the babbitt metal, which places them in the magnetic field of force and holds them tightest. The pattern of holes in the fixture plate corresponds exactly to the pattern of the magnetic table.

The brass plate is drilled for the rings, and three steel plugs are silver-soldered into holes in the plate to clamp the non-magnetic plate to the table. The locating plug, machined to fit into the center hole in the chuck, is held by a knurled nut on the top of the plate.

A tapped hole near the outside edge of the chuck receives the small drive screw, and a hole in the plate slips over the head of the screw so the plate is fixed in position on the table.

Loading time of the table is not reduced by this fixture, and grinding can be done either wet or dry. *J. R. Paquin, Worcester, Mass.*




## Cardboard Holder Locates Screws

SCREWS and small bolts that must be located in hard-to-reach spots in assemblies and fixtures can be easily held if they are driven through a piece of long cardboard and positioned by remote control for tightening. *Federico Strasser, Santiago de Chile.*

## Chemical Atmosphere Clears Machined Plastic Surfaces

A LABOR-SAVING idea when small plastic parts, such as costume jewelry, are to be polished is to expose them to an atmosphere of methyl methacrylate.

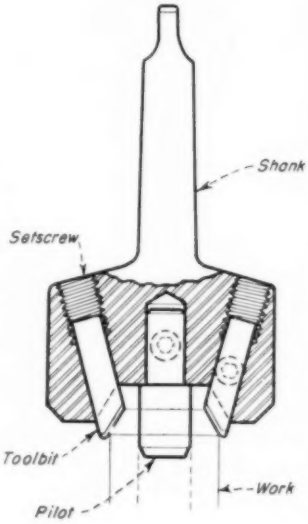
Plastic parts are suspended in glass jars after they have been machined and a wick is arranged in the jar so as not to touch the parts. The chemical—15 or 20 drops—is added to the wick, the jar is sealed, and then heated to 150° F for from 4 to 8 hours. After removal, the parts will be clear and polished. *James D. Cuyler, Chatham, N. J.*

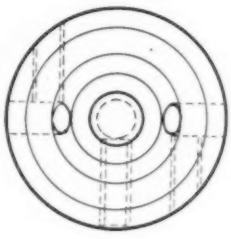
## Piloted Drillpress Tool Chamfers Drilled Stock

A JOB that required drilling and chamfering the ends of several different sizes of shafts came through our shop recently. The quantity needed was large, but most of our lathes and screw machines were busy while several drillpresses were idle. A tool was designed and made to allow us to do the job on a two-spindle press.

The body was made from cold-rolled stock, turned at the shank to fit the machine spindle. Two holes were drilled at a 15° angle from the axis to receive round bits with ground-off cutting edges. Setscrews fitted into the top ends of these holes (tapped) for adjustment of the bits. Setscrews in horizontal tapped holes clamped the bits in position.

A center hole was drilled and reamed for a pilot, and a cross hole admitted another setscrew for clamping the pilot. The arrangement of the pilot holes and the bit holes allowed changing the setup for different chamfering jobs on about the same stock size. The pilot might not be necessary on most jobs, but it added accuracy to the original chamfering tool. *Roger Isetts, Kenosha, Wis.*



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# *The Election of November 2, 1948* GAVE NO MANDATE FOR SOCIALISM

**The President and those who support his legislative program have objected to the substance of my previous editorial, which appeared under this headline: "Now is the Time to FIGHT SOCIALISM in Washington."**

In that editorial I explained how Washington is poised to follow the disastrous policy of forcing industry to skimp on new plants and new equipment. That policy landed Britain in the numbing embrace of the Socialists. I cited the experience of Britain to show how such skimping on industrial tools can bring a nation to economic stagnation . . . and Socialism.

The President, in his recent Jackson Day speech, brushed aside this warning . . . "They are again trying to frighten the people with the old worn-out bugaboo that Socialism is taking over in Washington." Senator Francis J. Myers of Pennsylvania asserted that I was guilty of "warfare against any reasonable effort to keep our system of free enterprise working."

These criticisms may be sincere. But they are not well-founded.

I want to show why they are not well-founded by basing this editorial on Washington rather than Britain.

**In Washington the Administration has proposed a legislative program, the key parts of which would clearly put the country far on the road to Socialism. Let us see how.**

*There are two steps in the process:*

FIRST: The government by its taxation program undermines private industry so that it cannot provide itself with the necessary new plant and tools.

SECOND: The government itself steps in to provide the plants and equipment that it has blocked industry from getting. *That is Socialism.*

**Here is how Washington is promoting Socialization of the steel industry—and of other industries.**

Steel has been expanding its capacity and improving its equipment chiefly by plowing back its profits. During the last three years it has spent $1.4 billion for new plants and new tools. That was more than the companies had available from their own earnings. But profits provided more

*continued on next page*

than half of that money – more than $700 million. The remainder came from loans and from depreciation reserves set aside out of the earnings to replace worn-out equipment.

Profits must continue to provide the funds needed to pay for the bulk of the steel industry's necessary expansion. That is because private citizens, their income slashed by heavy taxes, have not been willing to buy steel stocks even at prices ruinously low for the companies and their present stockholders. The stock market currently prices the mills and other facilities of the nation's principal steel-producing companies at far less than fifty percent of the cost of reproducing them.

Let us take another example. Profits are essential to expansion in the electric light and power industry also. This year private companies are planning to buy $2 billion worth of new plant and equipment. To do that without going overboard in debt, they must sell to the public some $300 million worth of common stock. A squeeze on their profits would make that sale virtually impossible.

For tens of thousands of small business enterprises profits afford virtually the only practical source of funds for new equipment and expansion.

In the face of these and many other examples that might be cited, what is the most effective way to prevent industry from re-equipping itself and expanding is capacity to meet our essential needs?

Obviously, it is to cut down profits. And that is what the Administration is trying to do. The President has declared that steel prices are too high, and is demanding that Congress raise taxes sharply on all corporations.

*There you have the first step toward socializing industry.*

*Next comes step two. Have the government supply the tools and equipment which, by taxation, it prevents industry from getting.*

The Administration has proposed legislation to carry out this second step. It is called the "Economic Stability Act of 1949," for short, the "Spence Bill."

This bill gives the President the power to provide industrial facilities – in steel, power or any other industry – where he finds that a shortage is hampering or is likely to hamper the economy.

True, the bill says that the government is not to construct new plants if private companies will do it through government loans, on terms prescribed by the President. That may be just one step short of complete socialization. But it is only a short step. And the Spence Bill authorizes the government to take that step.

By itself, the Administration's "Stability Act" sounds harmless enough. It would have the government build plants only as a last resort. But it provides also that if private enterprise cannot turn out all the goods the country needs, the government can and should step in and provide the equipment to do it.

Now, take that power together with an Administration tax program that undercuts the ability of private enterprise to supply the new plants and equipment it needs out of its own earnings. That combination promotes government ownership and operation of industry.

And that is Socialism.

**The American people, of course, have the right to live under any system they choose—Capitalism, Socialism, Fascism, Communism, or what-have-you. But before Socialism or any other "ism" is imposed upon us from above, the people should know the facts. If this editorial shall have contributed in some small degree to that end it will have served its purpose.**

**The election of November 2, 1948 gave no mandate for Socialism.**

*President, McGraw-Hill Publishing Company, Inc.*

# NEWS OF METALWORKING

## Export-Import Bank to Make Few Loans for Metalworking Purchases

WASHINGTON—Based on current and prospective trends, the Export-Import Bank of Washington won't be making substantial loans in 1949 for purchase of metalworking equipment by foreign countries.

In the first three months of the year, new credits authorized amounted to some $107 million. But the money was earmarked chiefly for agricultural, housing, public utility, and transportation objects. Only one of the credits set up thus far may result in purchase of metalworking equipment in the U. S.—a $20 million loan to Chile for completion of a steel mill now under construction near Concepcion.

**Israel Has Funds for Metalworking**

The only other money in sight for metalworking will come from Israel. Early this year, the new country received a $105 million credit. Almost $55 million of this has already been set aside for agricultural, housing, telecommunications, and transportation programs. Part of the remainder is expected to be used to buy machine tools. The question of how much should be answered within a month or two. This week, the Bank sent a mission to Israel to explore the whole matter of new buying programs.

Dim prospects for metalworking are accounted for by this fundamental fact:

Most of the bank's loaning will be in Latin America, as it has been for some time—particularly since operation of the European Recovery Program. And in that part of the world, the greatest immediate need is for agricultural and power development rather than for industry.

**Avoids Foreign Loans**

As a general policy, the Export-Import Bank steers clear of loans to European countries, leaving that job to ECA and the World Bank.

There have been—and will continue to be—some exceptions, but only some. Late last year, for instance, Ex-Im Bank loaned $10 million to Finland for expansion of her woodworking industries; Finland is now buying U. S. machinery and industrial raw materials with which to increase exports of scarce paper, pulp, and wood products, especially to western hemisphere and Marshall Plan countries.

Meanwhile, lending activity of the bank is now well ahead of a year ago. The $107 million of credits granted thus far in 1949 are already within striking distance of the $138 million for all of 1948.

## Big Ordnance Jobs To Go to Industry

WASHINGTON—A major change in procurement policy has been made by the Army Ordnance Department. The new policy: "Industry should play the mass production role in procurement of ordnance materiel, while manufacturing arsenals remain job shops and sources of technical knowledge."

Under the new procedure, arsenals are made responsible for procurement, or manufacture, of materiel designated by Washington headquarters. The arsenals are directed to show why the order should not be placed with industry. Only in cases where industry is unable to perform the job or the cost is too great, will the arsenal set up its own production line.

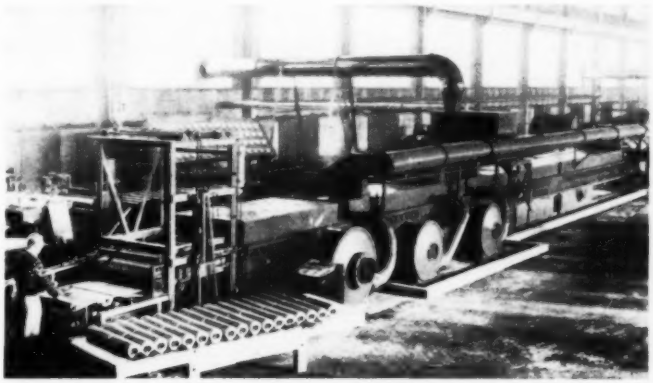
### $175 Million in Tool Orders from Europe

Europeans still prefer American machine tools. Even though machine-tool procurement in the U.S. through ECA won't go much over $50 million this year, foreign distributors and dealers in U.S. machine tools have orders in excess of $175 million. However, these orders must compete for hard-to-get dollars.

What this means is that as time goes by, purchases of U.S. machine tools and metalworking machinery — unlike some other commodities — will increase. With machine tool orders scheduled to top the $75 million mark in fiscal 1950, they could easily top the $100 million mark in fiscal 1951.

### Ford Bus Production Resumes

DEARBORN, Mich.—Production of Ford motor coaches, interrupted since Nov. 1, 1948, is being resumed, following settlement of a labor dispute in the plant of Wayne Works, Inc., Richmond, Ind., builders of Ford motor coach bodies. The Wayne Works is now back in operation. The shutdown period had been used to incorporate design and engineering advancements.



***SHEET ALUMINUM*** *or aluminum screen is treated for protection against weather conditions in this 100-ft. long continuous alodizing spray machine installed in Trentwood plant of Permanente Metals Corp., Spokane, Wash. It's one of the largest such machines in existence.*

# New IAM Head Gives Views on Labor, Management; No Policy Changes Seen

WASHINGTON—Albert J. Hayes replaces Harvey W. Brown as president of the 651,000-member International Association of Machinists on July 1.

This could be an event of major significance to the metalworking industry if it involved a change in the union's policies. For more employers in the industry have contracts with this union than any other. In turn, the IAM signs more contracts every year than any other union, and most of them are in metalworking shops and plants.

Actually, employers dealing with the IAM will notice little, if any, change when the 49-year-old Mr. Hayes takes over from the retiring Mr. Brown. There is one exception: the IAM stands on the verge of returning to the fold of the AFL. This may be accomplished in May. If not then, it's likely to come later.

Mr. Hayes does not plan to change any policies of the 61-year-old union. He is a Brown man, serving as resident vice president under Brown at Washington headquarters since 1944. While union policies may not change immediately, the attitude and views of Mr. Hayes may influence these policies later on.

ALBERT J. HAYES

### Labor-Management Questions

AMERICAN MACHINIST interviewed Mr. Hayes in his neat office in the Machinists Building in downtown Washington. We sought answers to some questions management has on its mind. They touched on contract demands, relations with employers, politics, government, reaffiliations with the AFL and other subjects.

Highlights of what Mr. Hayes told us:

The IAM wants "friendly, workable and reasonable" relations with employers, settling differences with minimum of work stoppages. In past 15 months, 99.1 percent of contracts signed without strikes. But where there has been management resistance, it has been stiffer because of Taft-Hartley.

Too many companies are taking advice from persons opposed to organized labor. They are paying a high price for it.

### Opposed to Communism

The IAM is opposed to communism and any other form of totalitarianism. Spotlight is on communism because there is a Communist organization. But there is more fascism in the minds of individuals.

Booms and busts are not inevitable. With proper balance, labor, industry and government can prevent busts, establish a stable economy. This can be upset only if our resources diminish or some opposing party gains control of the rest of the world and we are isolated with only our own resources.

IAM has no long blueprint of long-range demands on management. What it does will depend on adequacy of state and federal legislation on such things as social security, hours of work and annual wage.

The IAM is in politics to stay. All labor must be united in politics. From now on, the union member is going to be collectively and actively concerned in politics.

## Stockpile of 500,000 Railroad Cars Urged

Col. J. Monroe Johnson, head of the Office of Defense Transportation during and after the war, thinks the government's stockpiling program is missing one very important item—railroad cars.

"If we are going to have a 70-group airforce, a $14 to $18 billion military machine, a stockpile of strategic materials for war production, we also should have the railroad transport equipment to keep up with this military machine," the ODT head says.

Specifically, Johnson suggests that the military stockpile 500,000 railroad cars and maintain them in readiness for a future emergency. This would cost about $2,500,000,000. The government would foot the bill.

With the 500,000 cars, the railroads in wartime would have at least two million cars on hand. They now have 1,750,000, but some of these will have to be retired soon because of old age.

The railroads, however, are not too enthusiastic about Col. Johnson's suggestion. They point out that at the present time there are 60,000 cars surplus each day—not being used although they could be if there were orders to fill them.

The military has not answered the Johnson suggestion.

# Industry Seeks Plan to Conserve Manganese; Shortage May Be Licked

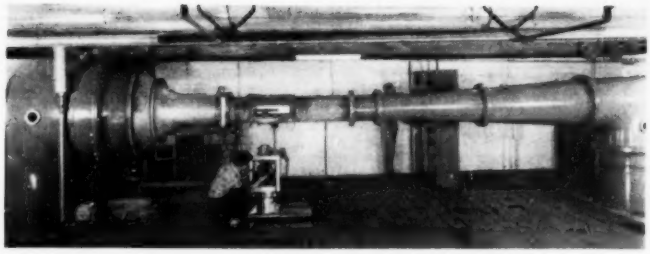
WASHINGTON—The steel industry and the government have teamed up to work out conservation of manganese.

Conservation, for the next two years at least, is necessary because of the Russian cut-off of about one-third of the U.S. imports of the steel-making material. After that time, imports from Brazil, African Gold Coast, and India will have more than made up the deficit.

Conservation techniques are already being studied. Steel people think they can cut down on consumption by using less manganese in smelting, and by reworking slags which contain a high percentage of the "cleanser." To make this latter idea work, however, researchers have to find a way to reduce the phosphorus content of the slags. The Iron and Steel Institute has put up $50,000 for a Bureau of Mines study of the problem.

A third possible conservation measure, now being studied, is the reduction of manganese content in alloys.

There is hope that the shortage during the next two years can be licked. A voluntary allocation of steel being made to Canada, through which ore cars (for the transport of manganese from the interior to South African ports) are being shipped, will mean an increase in shipments to this country in the near future. India can export considerably more manganese than it has recently if transportation in that country is run more effectively, and the government relaxes its export restrictions.



***WATER TUNNEL** in California Institute of Technology's Hydrodynamics Laboratory has speed of 100 ft. per second (about 70 mph), fastest tunnel of its type in operation. The tunnel is being used to study damage to metals moving through water at very high speeds. Findings will affect every type of hydraulic equipment, from ships' propellers to turbines.*

## Britain Bans Export of Tools, Metals, Machinery to Iron Curtain Countries

LONDON (McGraw-Hill World News) — Shipments of machinery, metals and tools from Britain to Russia and her Iron Curtain satellites are banned in an order made effective April 8 by the British Board of Trade, extending export licensing controls to cover a much wider range of goods of potential military value.

Goods involved in the new order thus become subject to the screening already being applied to such other exports of obvious military value as jet aircraft and engines.

The newly-listed goods, with very few exceptions, are exempt from export-licensing control if they are destined for any member of the British Commonwealth, the United States, and European countries belonging to O.E.E.C.

**Machinery Types Specified:**

Vertical boring and turning mills.

Broaching machines.

Forging hammers and drop stamps with a capacity of 1000 tons or more.

Forging machines of over 1000 tons capacity.

Gear-cutting, -grinding, and -shaving machines.

The following grinding machines: camshaft; crankshaft; and combined camshaft, crankpin and crankshaft machines; centerless grinders, both external and internal; and other internal grinding machines.

The following types of lathes: camshaft turning; crankshaft turning; relieving; surfacing and boring of 10-in. center height and over; and turret lathes having a bar capacity of 3 in. and over and a chuck capacity of 24 in. and over.

Presses of over 1000 tons capacity.

Marine and aircraft propeller profiling machines, including planing, shaping, milling, or grinding machines.

**Tools Added:**

Diamond dies, whether mounted or not, and tools and tool parts with diamond-tipped cutting edges.

Unmounted diamonds of industrial grade, and diamond powder.

**Metals, etc. Involved:**

Non-ferrous metals: Bismuth, columbium, strontium, titanium, zirconium, and alloys composed mainly of columbium or zirconium.

Strontium ores and concentrates.

Natural and artificial graphite, including mixtures of natural and artificial.

Mica slabs, sheets, and splittings.

Siloxanes, whether polymerized or not, and silastics or siloxane compounds including greases, resins and fluids, if they contain 50 percent of siloxanes or more, by weight.

## Pneumatic Tool Firm Moves to N. Y.

CLEVELAND—After more than 50 years in this city, Chicago Pneumatic Tool Co. is moving to a new $5 million plant in Utica, N. Y. Reason given for the move is the impossibility of finding additional factory space in Ohio.

While some equipment has already been moved, it will be several months before the Cleveland plant is finally closed, it is reported.

The Utica plant will provide the firm with almost five times as much manufacturing space as it has in Cleveland. There the firm is housed in a multiple story brick building with about 100,000 sq. ft. of space.

Utica, through popular subscription, donated 80 acres of land to the firm.

## Allocations of Steel to Be Cut

WASHINGTON—The bloom is off the voluntary allocations rose. And with it is gone the last chance of President Truman getting mandatory controls legislation or any part of the Spence anti-inflation bill.

Up until a month or so ago, steel consumers were fighting for supplies of the metal and those lucky enough to get a voluntary allocation were in Washington asking for even more.

Now, however, half the users with priorities are willing to take less.

Effective in June, allocations to 8 of the 17 users will be cut, some of them drastically. Another allocation (steel houses) has run out and actually has a surplus, which OIC will "trustee."

Commerce Dept. (OIC) this week announced the cuts which become effective in June. The two-month delay is due to the lag time between ordering and delivery from the mill.

Those taking cuts are: Armed forces, from 102,505 in February to 64,371 in June; Atomic Energy Commission, from 22,265 to 10,240; freight car builders, from 247,876 to 174,953; anthracite mines, from 2,570 to 2,000; barges, from 20,000 to 11,202; federal aeronautical agencies, from 1,926 to 614; tankers, from 40,380 to 31,551; warm air heating equipment, from 31,622 to 26,400.

Increases are going to merchant vessel builders, from 10,195 to 11,729 tons a month, and mining machinery manufacturers, from 26,400 to 31,785 tons a month. Producers of tank and oil field production equipment will hold at their present allocation of 16,530 tons a month, at least for June delivery. Canadian manufacturers of manganese ore cars for Africa, who made a lump sum deal with the steel people, will continue to get their 2,192 tons a month.

### Rolls-Royce Buys GM Interest in Aircraft Firm

MELBOURNE (McGraw-Hill World News) — Rolls-Royce Ltd., British firm of airplane engine makers, has bought out General Motors' interest in Commonwealth Aircraft Corp. General Motors-Holden, GM's Australian subsidiary, held a parcel of 70,000-pound shares in the $4 million aircraft concern.

### Private Plane Plant Closes

SAO PAULO, Brazil (McGraw-Hill World News)—The Companhia Aeronautica Paulista, which had made about 1,000 of the approximately 1,500 small planes flying in Brazil, has closed its doors. The airplane factory had long been losing money.

# 'Know-How' To Back ECA Aid

NEW YORK—ECA dollars must be implemented by information on American methods of increasing productivity if European industry is to make most effective use of U.S. aid. This point was emphasized at the annual meeting of the National Management Council held here April 7.

The task of bringing American know-how to Europe is not a problem for the federal government alone, according to H. B. Maynard, president of the Council, but rather one that requires the active support and participation of American management. To this end the NMC has initiated a 4-step program that is already under way in conjunction with ECA and other agencies.

Included in the program is the gathering of information on incentive systems, the distribution of films illustrating American methods and production techniques, the supplying of publications on all phases of management to libraries, and the participation in congresses of international management.

Work is done on a voluntary, nonprofit basis by the Council, which includes in its membership industrial concerns, management firms, and educational institutions interested in the exchange of information on scientific management.

Addressing a strong appeal to all American industry to support the program, William Batt at SKF Industries, stated: "The world knows very well how much it needs and wants American goods. It is just beginning to recognize that American skills are even more important because they aren't consumed."

**CLIFFORD J. BAXTER**, *named general sales manager of Gisholt Machine Co., Madison, Wis. He has been with the firm 25 years, starting in the shop. For the past 20 years he has been district manager at Chicago.*

**2½-TON CRANE** *on this Carrimore semi-trailer makes possible road-delivery of shoe-making machinery. Built for British United Shoe Machinery Co., Ltd., Leicester, the jib runway can be extended, permitting the hand-operated crane to lift a heavy machinery component free of the tailboard, ready to unload it on the customer's receiving platform.*

# 75 Cutting Tool Manufacturers Get $60 Million of Ghost War Orders

WASHINGTON — The government has started to send out its second batch of "ghost" war orders, going to some 75 manufacturers of cutting tools. The first batch covered the machine tool industry.

The cutting tool orders include $60 million worth of tools made with high-speed steel. The dozen companies that make cemented carbide cuttings tools will get their orders later. Reason: the National Security Resources Board's study of the country's capacity to produce carbide tools isn't completed yet; so NSRB doesn't know how many of these tools to order.

The government has a substantial reserve of cutting tools. So the total of ghost orders is comparatively low in relation to the industry's capacity.

**Production Estimate Given**

The NSRB quotes the Metal Cutting Tool Institute as estimating production of its members at $84.6 million in 1947, compared with estimates of $178 million in 1942, the wartime peak, and $47.1 million in 1940. The industry at present is running on a one-shift basis—and this shift is not at full capacity. Full operation on one shift could probably boost output by 33-1/3% over 1947 output. Adding a second shift would add the equivalent of 90% of full first-shift output; a third shift would add another 60%.

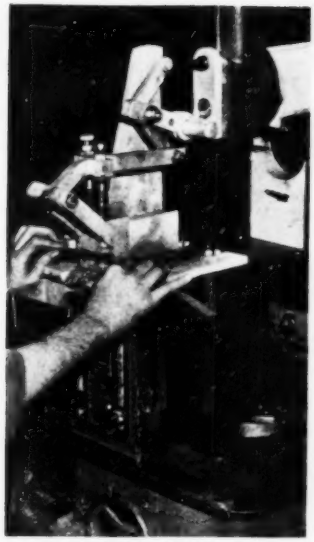
These figures are all for institute members. To get total capacity you have to add 30% to account for production by non-members. Thus, the total annual capacity of the industry, based on 1947 output of institute members, comes to more than $350 million.

The orders for high-speed steel tools are based on dollar value rather than number because of the great differences between various types of cutting tools. They include such items as: counterbores, cutoff blades, metal-slitting saws, drills, taps, dies, and broaches.

**To Review Orders Yearly**

Orders will be reviewed once a year. That will give the government the opportunity to revise them in line with technological developments and changes in reserves, industry capacity, and military needs.

The NSRB report recommends that manufacture of cutting tools be given the highest priority in the event of a war, both "ahead of and along with the manufacture of weapons of war." It calls for draft deferment of industry employees, particularly skilled ones, to start production quickly in emergency.



***METAL WASHER** shortages are relieved at an Air Force base by this soldier-devised machine which quickly punches washers out of strips of metal at a rate of 1000 an hour. The machine weighs only 30 lbs.*

# 30 British Labor-Management Teams To Study U. S. Production Techniques

NEW YORK—The Anglo-American Council on Productivity is bringing 30 teams from Britain to study U. S. production techniques. Steel foundry managers and workers were the first to arrive.

A delegation from the Amalgamated Engineers' Union — British counterpart of our CIO Auto Workers—is also here visiting auto, aircraft, agricultural equipment, tool and die and other plants as guests of the UAW-CIO under an "exchange" plan.

The 16-man steel foundry team currently visiting U. S. industrial plants will spend a total of six weeks here. They have already visited plants in New Jersey, Milwaukee, Detroit, Chicago, Columbus, Ohio, Pennsylvania. The group is under the leadership of Frank A. Matrin, managing director of Osborne Foundry & Engineering Co., Ltd., Sheffield, England.

The teams visit the U. S. under this arrangement: Employers pay their wages; the British government pays the ocean passage; ECA pays living and traveling expenses in this country.

At ECA offices in New York, AMERICAN MACHINIST learned of impressions received by the British visitors in their plant visits. For one, they were impressed by our apprenticeship training. In England, they said, a boy enters the foundry at 14 years of age, not becoming a journeyman until he has obtained seven years of experience. By contrast, they learned that here a young man can join at any age, serving an apprenticeship of from two to four years only.

They remarked also on the availability of tools to the worker. In England, generally, workers have with them only one tool at a time. They have to walk to a tool bin each time they need another tool. Here, they observed, a man can get the tool he needs simply by signaling for it.

The greater use of portable equipment in plants in the U. S. is another idea they would like to take back with them to speed production in England.

# Metal Washer Machine Overcomes Supply Shortages for Air Force Shop

FAIRFIELD-SUISUN AIR FORCE BASE, Calif.—Supply and maintenance men are heralding a new metal washer machine. Designed to overcome supply shortages in certain types of washers, the device has worked so well that supply personnel have quit worrying about all types of metal washers.

The machine was invented by S/Sgt Howard Halstead, 1501st Maintenance Squadron, who works in the sheet metal shop at this MATS Base. He prefers to call his invention a "Punch Press Attachment for Metal-Shapers," and claims that its use produces a washer five times more efficiently than earlier methods did.

Fairfield-Suisun AFB's use of the attachment has been mainly in manufacturing the "dimple" type of washer. However, the setup is a progressive die system which punches the washers out of strips of metal; by changing either one or both of the two dies on the attachment, washers of practically any size or shape can be punched out. The model attachment was made for use on the metal shaper with a twelve-inch horizontal stroke. Depending on the speed and skill of the operator, any amount of washers, up to 1,000 an hour, can be produced without flaws.

The idea for such a machine was suggested to Halstead by Ward Baines, civilian foreman of the sheet metal shop. Baines was not satisfied with the quality or quantity of washers made on the shop's large punch presses, and the system of making them by hand was laborious and faulty. So he asked the men in his department if they could offer improvements to the system. The hand or press methods had been used when washer stocks became "critically" short. Halstead's answer to the problem was so good that stock balances in the warehouse are now kept up to snuff without regard to distant supply sources.

The sergeant's invention doesn't weigh much—about 30 pounds—but it is claimed that it does a far better job than many presses weighing tons. Then minutes is all the time it takes to attach it to the shaper. Once the bolts are tightened, all the operator has to do is adjust the speed of the stroke and set to work.

On the 12" shaper attachment, metals of 0.032 gauge can be handled. Larger shapers would have an attachment to use strips up to an eighth of an inch thick.

## Machine Tool Electrification Forum to Be Held in Buffalo

BUFFALO, N. Y.—The 1949 Westinghouse Machine Tool Electrification Forum will be held here April 26-27, the first day's session convening in the Niagara Room of the Hotel Statler, the second day's session at the Buffalo plant of Westinghouse Electric Corp.

## Steel Mill Suspends Operations

RIO DE JANEIRO (McGraw-Hill World News)—Blast furnace operations at the Brazilian government's Volta Redonda steel mill were suspended in March when the refractory lining went out, long before expected.

Removal of the old lining and installations of a new one were estimated to take four months. Steel output continued by making use of cold pig iron stocks.

The Volta Redonda mill, which the U.S. government helped finance, began operations in 1946. Steel output in 1948 has been reported as 196,000 tons, compared with 145,000 in 1947.

## Dow Head Killed in Plane Crash

LONDON, Ont.—Willard H. Dow, 52, president of the Dow Chemical Co., Midland, Mich., was killed in a plane crash in Canada while en route to Boston to attend the convocation of the Massachusetts Institute of Technology. Dr. Dow was long considered one of the foremost chemical experts in this country. Last October he received the Medal for the Advancement of Research, an award of the American Society of Metals.

# U.S. MACHINE TOOL EXPORTS by COUNTRY, 1947 and 1948

| COUNTRY | DOLLAR VALUE 1947 | 1948 |
|---|---|---|
| Greenland | 22,077 | 1,615 |
| Canada | 10,038,937 | 8,557,493 |
| Newf. & Lab. | 33,058 | 32,880 |
| Nor. No. Amer., Total | 10,094,072 | 8,591,988 |
| Mexico | 3,056,571 | 1,752,368 |
| Guatemala | 152,209 | 87,220 |
| Br. Honduras | 518 | 1,456 |
| El Salvador | 52,800 | 60,502 |
| Greenland | 22,077 | 1,615 |
| Iceland | 58,136 | |
| Honduras | 44,420 | 20,192 |
| Nicaragua | 33,097 | 43,526 |
| Costa Rica | 67,076 | 30,410 |
| Panama | 34,444 | 41,153 |
| Canal Zone | 48,881 | 35,864 |
| Bermuda | 9,847 | 3,029 |
| Bahamas | 10,685 | 5,136 |
| Cuba | 556,554 | 543,499 |
| Jamaica | 29,926 | 34,441 |
| Haiti | 21,770 | 29,156 |
| Dominican Rep. | 108,981 | 55,267 |
| Leeward & Windw. Is. | 912 | 19,232 |
| Barbados | 5,804 | 1,440 |
| Trinidad & Tobago | 28,717 | 14,081 |
| Curacao (N.W.I.) | 132,525 | 75,157 |
| Fr. W. Indies | 2,272 | 2,564 |
| So. No. Amer., Total | 4,398,009 | 2,880,406 |
| Colombia | 1,072,696 | 627,792 |
| Venezuela | 983,218 | 1,019,540 |
| Br. Guiana | 27,215 | 12,476 |
| Surinam | 19,127 | 35,772 |
| Fr. Guiana | 1,140 | 939 |
| Ecuador | 82,616 | 81,660 |
| Peru | 321,051 | 615,191 |
| Bolivia | 88,210 | 115,466 |
| Chile | 812,813 | 1,058,731 |
| Brazil | 4,509,947 | 2,104,091 |
| Paraguay | 22,484 | 12,974 |
| Uruguay | 605,821 | 226,101 |
| Argentina | 7,078,885 | 4,186,668 |
| So. Amer., Total | 15,625,223 | 10,096,516 |
| Iceland (ECA) | 58,136 | 32,642 |
| Sweden (ECA) | 8,562,593 | 2,274,450 |
| Norway (ECA) | 927,281 | 392,758 |
| Denmark (ECA) | 391,916 | 525,554 |
| United Kingdom (ECA) | 9,624,056 | 10,324,424 |
| Eire (ECA) | 111,046 | 104,343 |
| Netherlands (ECA) | 4,256,057 | 3,995,939 |
| Belgium & Lux. (ECA) | 3,698,579 | 2,704,380 |
| France (ECA) | 13,006,344 | 6,915,008 |
| Germany (ECA) | 2,854 | 36,647 |
| Austria (ECA) | 383,379 | 1,276,737 |
| Czecho-Slovakia (E) | 1,643,051 | 458,179 |
| Hungary (E) | 210,873 | 53,169 |
| Switzerland (ECA) | 3,307,143 | 3,506,155 |
| Finland (E) | 1,075,822 | 342,904 |
| Lithuania (E) | | 24,028 |
| Poland & Danzig (E) | 4,990,110 | 2,910,256 |
| U.S.S.R. (E) | 15,851,001 | 1,963,523 |
| Azores | 4,845 | 3,511 |
| Spain | 293,769 | 437,487 |
| Portugal (ECA) | 651,162 | 203,872 |
| Malta, Gozo & Cyprus | 13,763 | 3,175 |
| Italy (ECA) | 463,497 | 2,633,166 |
| Trieste | | 7,518 |
| Yugoslavia (E) | 2,262,191 | 38,001 |
| Albania (E) | 20 905 | |
| Greece (ECA) | 797,902 | 242,128 |
| Europe, Total | 72,608,275 | 41,409,949 |
| Turkey (ECA) | 1,499,517 | 460,421 |
| Syria | 228,245 | 13,633 |
| Lebanon | | 129,911 |
| Iraq | 14,177 | 42,358 |
| Iran | 12,305 | 66,374 |
| Palestine, Trans Jordan | 78,832 | 11,797 |
| Kuwait | 1,341 | 163,225 |
| Saudi Arabia | 164,903 | 165,224 |
| Arabia Pen. Sts. | | 400 |
| Bahrein | 54,397 | 17,186 |
| Afghanistan | 13,849 | 28,938 |
| India | 1,779,557 | 2,428,834 |
| Pakistan | | 5,966 |
| Ceylon | 19,384 | 24,291 |
| Burma | 19,148 | 12,567 |
| Thailand | 3,307 | 15,391 |
| Fr. Indo-China & Fr. India | 56,238 | 45,122 |
| British Malaya | 21,755 | 34,405 |
| Netherlands Indies | 568,918 | 285,873 |
| Philippines | 450,052 | 268,861 |
| China | 3,749,007 | 680,825 |
| Korea | | 7,040 |
| Hong Kong | 208,869 | 343,115 |
| Formosa | 163,637 | 72,132 |
| Japan | 138 | 695 |
| Asia, Total | 9,169,704 | 5,442,758 |
| Australia | 3,414,799 | 1,162,740 |
| New Guinea | 24,618 | |
| New Zealand | 503,010 | 132,131 |
| Br. Oceania | | 2,556 |
| Fr. Oceania | 6,922 | 2,976 |
| Oceania, Total | 3,949,349 | 1,300,403 |

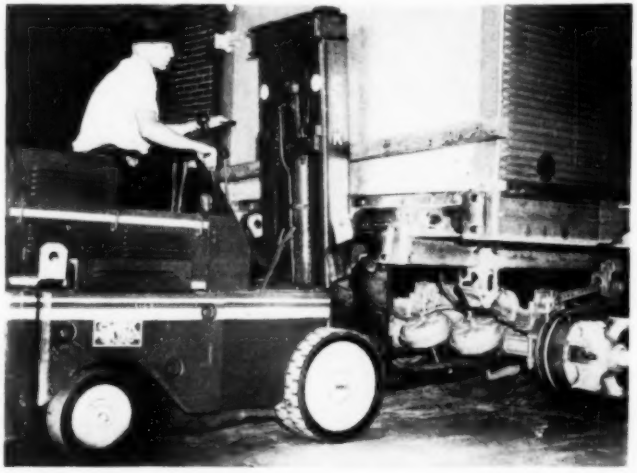
| COUNTRY | DOLLAR VALUE 1947 | 1948 |
|---|---|---|
| Fr. Morocco | 228,187 | 110,989 |
| Tangier | 674 | 1,403 |
| Algeria | 146,350 | 62,289 |
| Tunisia | 50,016 | 18,039 |
| Egypt | 373,550 | 106,821 |
| Ang-Egypt-Sudan | 145 | 491 |
| Canary Is. | 291 | 714 |
| Cameroon | 24,330 | 36,219 |
| Fr. Equat. Africa | 11,184 | 59,818 |
| Fr. W. Africa | 22,528 | 67,842 |
| Gold Coast | 14,134 | 17,683 |
| Nigeria | 3,751 | 29,318 |
| Br. W. Africa | 464 | 628 |
| Madeira Is. | | 2,760 |
| Angola & Port. Gu. | 12,887 | 17,394 |
| Liberia | 6,457 | 3,375 |

| COUNTRY | DOLLAR VALUE 1947 | 1948 |
|---|---|---|
| Belgian Congo | 159,026 | 286,815 |
| East It. Africa | 36,010 | |
| Ethiopia | 1,842 | 374 |
| Fr. Somaliland | | 4,152 |
| Mauritius & Dep. | | 113 |
| Br. E. Africa | 45,693 | 26,430 |
| Mozambique | 88,715 | 75,095 |
| Madagascar | 3,098 | 1,291 |
| Un. of So. Africa | 1,766,975 | 1,394,566 |
| No. Rhodesia | 12,987 | 39,327 |
| So. Rhodesia | 37,185 | 7,296 |
| Africa, Total | 3,046,475 | 2,371,242 |
| Total | 118,829,723 | 72,068,549 |

(E) Indicates Eastern European Countries.

# U.S. EXPORTS by COMMODITIES

| COMMODITY | DOLLAR VALUE 1947 | 1948 |
|---|---|---|
| Engine and Tool Room Lathes | 7,706,512 | 6,335,229 |
| Bench Type Light Duty Lathes | 2,332,381 | 1,269,321 |
| Turret Lathes, Vertical | 2,823,991 | 811,294 |
| Turret Lathes, Ram and Saddle Type | 3,887,579 | 2,298,868 |
| Automatic Chucking and Between-Center Lathes | 6,797,882 | 1,745,168 |
| Polishing, Buffing and Burnishing Lathes | 2,942,655 | 1,271,834 |
| Artillery, Ammunition and Boring Lathes | 5,660,881 | 2,611,637 |
| Vertical Boring and Turning Mills | 2,458,769 | 1,726,859 |
| Precision Boring Machines | 3,109,545 | 1,726,851 |
| Tapping and Threading Machines | 1,518,982 | 1,565,894 |
| Automatic Screw Machines, Bar Types | 3,288,024 | 2,905,322 |
| Knee and Column Type Milling Machines | 4,812,503 | 2,700,739 |
| Other Milling Machines | 8,568,907 | 5,487,089 |
| Gear Cutting Machines | 6,220,511 | 4,976,291 |
| Drilling Machines, Sensitive, Upright and Gag (Except Bench Type) | 1,539,316 | 1,097,509 |
| Radial Drilling Machines | 2,403,802 | 1,106,624 |
| Other Drilling Machines | 3,312,862 | 1,345,575 |
| Planers | 2,511,280 | 1,609,397 |
| Shapers, except Gear Type | 2,109,552 | 1,182,634 |
| Surface Grinding Machines | 3,482,386 | 2,003,358 |
| External Cylindrical Grinding Machines (Except Universal) | 3,183,040 | 1,216,901 |
| Internal Grinding Machines | 2,673,304 | 1,194,878 |
| Tool and Cutter Grinding Machines | 3,864,917 | 2,068,865 |
| External Cylindrical Universal Grinding Machines | 1,922,607 | 1,339,461 |
| Gear-Tooth Grinding Machines | 493,467 | 152,358 |
| Honing and Lapping Machines, except Gear Type | 744,680 | 426,712 |
| Thread Grinding Machines | 346,204 | 137,339 |
| Metal Grinding Machines, N.E.S. | 3,483,847 | 2,231,961 |
| Metal Grinding Machine Parts | 1,171,736 | 1,106,849 |
| Horizontal Boring, Drilling and Milling Machines | 2,875,376 | 2,425,710 |
| Broaching Machines — all Types | 1,335,823 | 553,772 |
| Gear-Honing and Lapping Machines, and Gear-Finishing Machines, N.E.S. | 1,262,816 | 918,193 |
| Power-Driven Metalworking Machine Tools, N.E.S. | 4,482,140 | 3,255,545 |
| Chucks for Machine Tools | 1,586,655 | 1,090,575 |
| Machine Tool Parts, N.E.S. | 11,914,890 | 8,165,298 |



***FORK TRUCK*** *saves day for trailer too large to pass under entrance at National Guard Armory, Washington, D. C. Trailer was stripped of tires and rims, front end lowered and placed on casters. Clark "Utilitruc" of 7000-lb. capacity then raised the rear end to provide one-inch clearance of the bare wheels, and eased the trailer through the door.*

# Increase in Japan's Machinery, Metal Exports Planned; Self Support is Aim

TOKYO — (McGraw-Hill World News) — Under the new United States program to put Japan on a self-supporting basis by 1953, important changes will be made in the country's export program—including the raising of metal and machinery exports to $350 million.

During 1930-34, the period taken as the average pre-war yardstick, metals and machinery accounted for only 11% of Japanese exports. Under the new plan exports in this category will climb to 26% of the 1953 total. This shift is more startling than the comparative figures would first indicate—since total exports will be 15% less than in the 1930-34 base period. In view of the other adjustments in export commodities, including a drop of nearly 30% in textiles, it actually means that metals and machinery will be up a total of 95%.

**Japan Has Little to Export Now**

How to obtain enough food for a minimum feeding level is the guts of Japan's problem. Minimum food needs add up to a $700 million strike against the economic batters before they even get to the plate. For Japan has little which it can export in order to pay for imports in that amount.

## Metal, Machinery Exports To Pay for Raw Materials

Major elements in Japan's production picture are metals and machinery. Here is a capsule picture of what must be achieved for Japan to attain self-support:

Ingot steel production must reach 4 million tons in 1953, with finished steel totaling 3 million tons. Of the latter figure, 2.5 million tons are required for home use in construction, railways, replacement machinery, utilities, mining and merchant vessels.

Adequate capacity exists. Rolled steel capacity is 4.2 million tons, well over the 2¾ million tons required for the program. But raw materials, worth $150 million, have to be imported, including 3.8 million tons of iron ore, 200,000 tons of pig iron, 100,000 tons of manganese ore, 100,000 tons of magnesia clinker and 2.5 million tons of coking coal.

Metal and machinery exports of $350 million more than pay for these materials.

At best, indigenous production will account for $300 million. Japan's major foreign trade asset is an industrial plant powered by adequate resources of hydroelectric power and of low grade coal, operated by an overstaff of trained labor and managed by an antiquated, extremely inefficient executive organization.

This plant, however, must be fed imported raw materials—raw cotton, raw wool, iron ore, pig iron, high grade coking coal, salt, bauxite, rubber, and magnesia clinker.

**$1,300 Million in Exports**

Besides the imports for consumption, it is predicted that $800 million worth of raw materials must be brought in annually. With these materials and from domestic resources Japan will produce exports worth a little over $1,300 million. (Import values are cif and exports fob, Japanese ports.)

The deficit of almost $200 million in the commodity account will be made up by invisible income: expenditures of foreigners in Japan, immigrant remittances and decreased freight charges from carrying a portion of Japan's imports and exports in a revitalized Japanese merchant fleet.

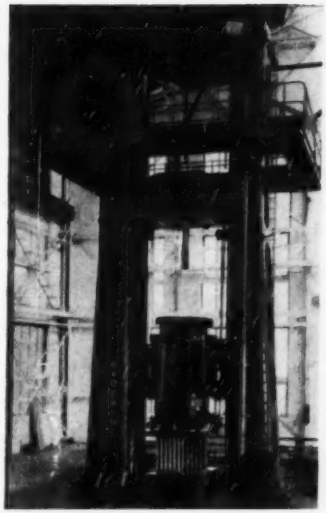
**Capital Goods in Demand**

Significant changes are in prospect for Japan's export pattern. Increase in machinery shipments reflects the increased demand for capital goods throughout the Far East. Without a large volume of machinery trade which earns a large foreign exchange profit (exports of machinery are calculated to bring in $2.50 for every dollar of imported materials), there would be no hope of making Japan self-supporting even on the modest living standard proposed.

**$165 Million Metal, Machinery Exports**

Export projections for 1953 include 150,000 tons of steel mill products, 250 steam locomotives, 2,500 freight cars, 10,000 trucks, one million bicycles and 150,000 gross tons of steel ships. This will account for $165 million of metal and machinery exports. The remainder will consist of electrical and communications equipment, textile machinery, aluminum products, brass and copper products and miscellaneous machinery.

Industrial production to support a foreign trade balance for Japan requires an absolute increase of 35% over the 1930-1934 level. Using 1930-34 equal to 100, index of coal production must hit 155, iron ore 350, pig iron 240, crude steel 145, finished steel 125, machinery 160.



***TESTING MACHINE** will load specimens up to 5,000,000 lbs. under a hydraulic pressure of 2500 lbs. per sq. in. It's installed at the Aeronautical Structures Laboratory, Philadelphia. Engineers there can measure the largest and strongest airplane structural loads of metals such as aluminum and magnesium. The machine will test specimens up to 30 ft. long in tension or compression and up to 50 ft. long in bending. (Authenticated News photo.)*

## Inert Arc Welder Okayed by FCC

CHICAGO—The threat to continued use of high frequency inert gas arc welding was ended last month by Federal Communications Commission approval of a National Cylinder Gas Co. unit that does not interfere with radio or television reception.

Approval follows a year and a half of intensive research by welding equipment manufacturers, and beats the FCC's April 30 deadline for production of high frequency welders that do cause interference.

This was the first such approval granted by FCC. General Electric also has since announced development of inert-arc welders equipped with a system for eliminating radio interference. Presumably other manufacturers have or will have similar units before the April 30 deadline.

Widely adopted since the early war years, welding with an arc shielded by inert gases such as helium or argon has attained considerable importance. It is used for welding metals such as magnesium, aluminum, copper bronze, stainless and light gauge steel. For some metals it is the only practical welding method developed.

# Detroit

## END OF CONVERSION DEALS BRINGS PRICE CUTS . . . NEW G.M. BODY LINE . . . APRIL PRODUCTION PUSHES PAST 120,000-A-WEEK LEVEL

**When General Motors** cut car prices, better than proportionate to wage reductions under its cost-of-living contract, the industry was not completely sure what to do. When Ford followed suit a few weeks later, there was no longer much doubt. Prices began to come down; those which are still being maintained will likely move before too long.

There is one crystal-clear reason for the rest of the industry's following suit: The public expects readjustments now, and will hold off buying on many individual makes until they appear. This by-product of the appearance of a normal market in auto selling made a dramatic entrance after Henry Ford II hinted at the possibility of price cuts later on. Dealer business fell off heavily—enough so that the company was spurred into putting through the reductions sooner than had been anticipated.

One factor in the procurement picture helps to make these reductions quite possible. Conversion steel is becoming a matter of history. Along with its disappearance are fading added costs of nearly $100 an average ton for a substantial share of the steel going into a car.

### Saving of $10 or More Per Car

Perhaps more than a tenth of automotive steel has been conversion steel of late, although there are no solidly grounded estimates on this score. Inasmuch as somewhat more than a ton of steel goes into the average automobile, this would indicate a per-car saving of $10 or more.

That saving is now manifesting itself. Conversion steel deals are no longer being entered into. However, companies are still getting deliveries on commitments made earlier, and will be getting them up until July 1. From that time onward, the conversion approach to steel procurement will be about as rare as Communists in the Union League Club.

Virtually all steel companies are promising their customers much better situations after the third quarter begins. They largely attribute this pleasing state of affairs to more capacity, but the fact is that demand from many lines has fallen off, permitting enlarged deliveries to continuing strain points.

How long the auto market will last is anyone's guess. For the record, all companies are optimistic for summer. Behind the record, however, suppliers are being cut back here and there; "factory official cars at reduced prices" signs are blossoming out for the first time in almost a decade at dealer points; and other apt signs indicate some changes in the passenger car world.

### Chrysler Works on Transmission

In the engineering rooms, meanwhile, the development schedules prove that individual companies are determined to get into technological line with competition. At Chrysler's heavily barred project rooms, for instance, crews are busily at work trying to come up with designs which will out-flow Buick's Dynaflow transmission, and do so without heat diffusion problems which reportedly are bothering that producer.

In General Motors, finishing touches are being put on variations of a brand-new "C" body line. This is somewhat of a surprise. The new "B" series, which will first appear before too long on Buick, and then on other makes, was expected to be the only major project at hand for the time. But the new "C" series will go not only on Cadillac, but will be modified for bigger-car use for Buick and Olds as well.

In another shop, a foreign front-wheel-drive car is being torn down and examined for possible adaptation to the American market. The company sponsoring this work has already had extensive conversations on licensing, etc., with the European producer.

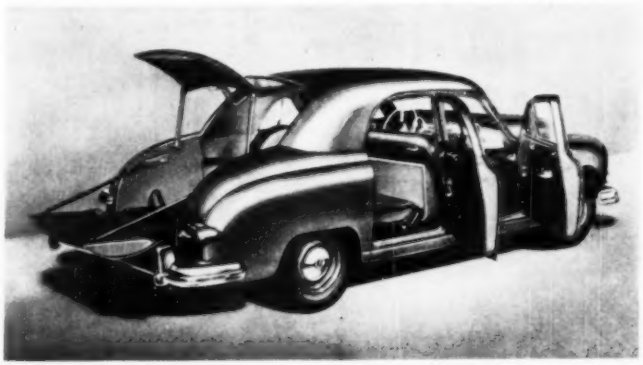
And outside of the laboratories, autodom was set abuzz in April when George Walker, designer of the 1949 Ford, had lunch with Harold T. Youngren, Ford engineering chief. Walker finished up his stint for Ford after the 1949 car came out, and the gossip at the time was that differences between him and Youngren were responsible. Their Recess Club luncheon might well presage their getting back together again.

Production, meanwhile, is ballooning out in turn with the seasonal spring upturn in sales—of which not enough has yet appeared to measure whether it is ahead or behind the normal line.

### Packard Closed for Model Changes

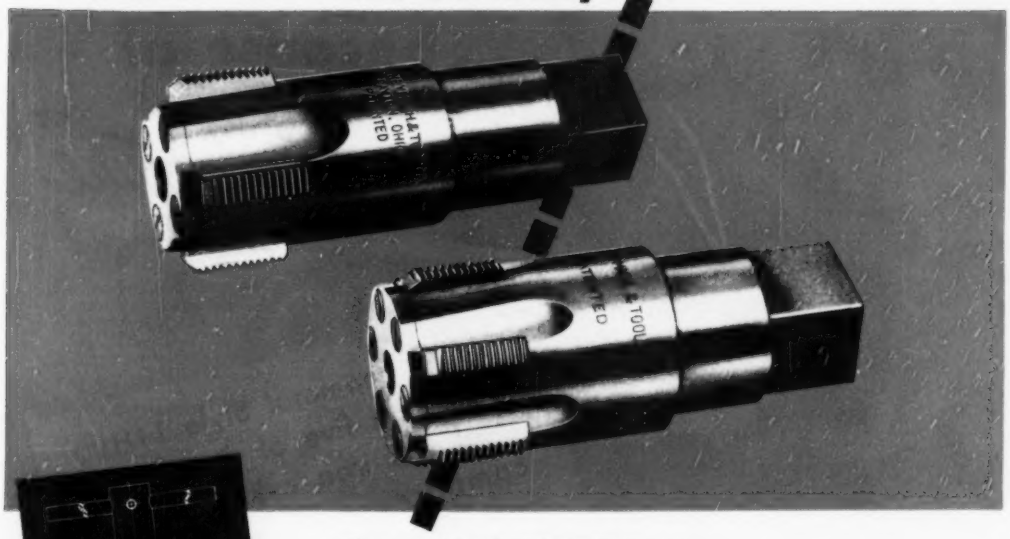
A strike at the frame-making shops of Midland Steel Products Co. having been averted, Chrysler Corp. divisions are striving to enlarge production as rapidly as possible and fill initial 1949 model orders. Most other companies are going ahead as fast as incoming steel shipments permit, one exception being Packard, which closed down in early April for changeover to new models.

The result has been that output during April enlarged above the 120,000-a-week level, which is definitely rarefied territory for car and truck manufacturing. Further, it gave evidence of remaining there at least for a time, indicating that this month would probably be one of the best on record.



***KAISER-FRAZER** has introduced an entirely new type automobile—the Traveler. It's a six-passenger family sedan designed to double as a light cargo unit for work or recreation. The entire rear of the car opens from floor to roof for easy loading, and the rear seat folds away in 10 seconds to provide 130 cubic feet of cargo space. With the hinged rear panels closed, the Traveler looks just like a standard four-door sedan*

# IF YOU HAVE A LOT OF THREADING,



## these MURCHEY taps will *Save you money*

Contrast these Murchy Adjustable Taps with the conventional, solid tap on a straight unit cost basis (cost per inch of threaded hole). Every tap, after a certain amount of use, has to be re-ground. You can regrind the chasers of these taps and still retain exact size because of their adjustable feature. In fact, you can keep on regrinding the chasers both on the chamfer and the face and adjusting them radially outward until there are practically no cutting teeth left. And then, merely with a new set of chasers, you can start the whole cycle over again. A set of chasers costs a lot less than a new, solid tap.

Another saving is that a single tap body may be used for a wide range of sizes and pitches with the appropriate chasers.

5072

**Taps "EHB" and "RHB" (4 and 6 chasers) models are standard in sizes from 1¼" to 6". Special taps of this kind can be made entirely to your specifications. Bottoming taps are available by use of overhanging chasers.**

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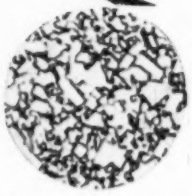
# Better Performance . . . because of Better Structure*

This Kennametal Style 11H90 Tool turns five of these semi-steel cast-iron cylinder liners compared to one with the carbide tool formerly used

It takes a hard, strong, sound tool material to remove 4,500 cubic inches of metal from five of these semi-steel cast-iron cylinder liners before regrinding—and then to repeat the performance after each resharpening, over the entire life of the tool.



* Consistent soundness and uniformity of structure characterize all Kennametal compositions, as illustrated in the micrograph above (1500 times enlargement). Note absence of large grains, and virtual freedom from porosity.

All Kennametal compositions are much harder than the hardest tool steel, and the uniformity of hardness and strength of each grade comes from a consistently sound physical structure which is produced by distinctive processing, and precise, scientific methods of control.

The proof of the pudding is in the eating—service results prove that a carbide which gives superior service is that having uniform grain structure, and therefore consistently maintained hardness, strength, and wear-resistance. That's Kennametal.

Equally important in cutting machining costs are Kennametal developments in mechanically-held tooling which further extend the profitable use and low-cost maintenance of carbide tooling.

Kennametal tooling is completely-proved—can save money on 90% of your routine and unusual jobs. Ask our district engineer to demonstrate.

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**LATROBE, PA.**

**MANUFACTURERS OF SUPERIOR CEMENTED CARBIDES AND CUTTING TOOLS THAT INCREASE PRODUCTION**

STYLE BL

STYLE C

STYLE FL

STYLE GL

KENNAMATIC STYLE 125K

SERRATED MILLING CUTTER BLADES

# Specifications for Wooden Pallets...I

Condensed from "Minimum Standard Specifications for Warehouse or Returnable Wooden Pallets," adopted by NATIONAL WOODEN PALLET MANUFACTURERS ASSOCIATION, 1949.

PALLETS fall into three groups: expendable, special purpose, and general purpose. Design and construction of pallets in the first two groups is a matter for agreement between pallet manufacturer and customer. Thus, the following are a guide only in the construction of pallets for general use in warehousing and shipping and are *minimum specifications.*

### *Types, Designs, Styles*

Types of wooden pallets are three:

**Flush stringer:** outside stringers are flush with the ends of the deck boards.

**Single wing or airplane:** outside stringers are set inboard a number of inches on the top deck, but are flush with the ends of the bottom deck boards.

**Double wing or stevedore:** outside stringers are set inboard of both top and bottom deck boards to accommodate bar slings.

The most common designs of wooden pallets are:

**Two-way:** forks may enter from two sides only and from opposite directions.

**Four-way:** forks may enter from all four sides.

**Eight-way:** forks may enter from all four sides, and from the angle of all four corners.

There are two styles of wooden pallets:

**Single-face,** only one deck as the top surface.

**Double-face,** which have both top and bottom decks, and which come in two different designs:

*Reversible,* which have identical top and bottom decks; goods may be stacked on either side.

*Non-reversible,* on which the top and bottom decks have different openings; goods may be stacked only on the top deck.

### *Nomenclature*

*Deck boards* make up the faces of a pallet and either carry, or rest upon, the goods packed thereon.

*Stringers* are the wooden runners to which the deck boards are nailed. They serve as spacers between decks.

*Posts or columns* are the square or round parts, of wood or other material, employed on some 4-way and all 8-way pallets, in place of, and serving the same purpose as, stringers.

### *Definitions*

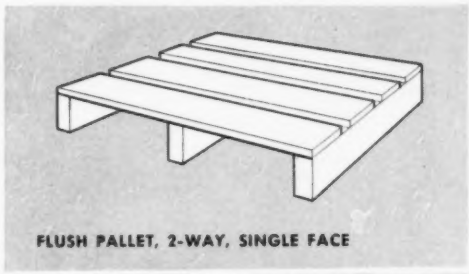
Pallet dimensions always shall be expressed in inches, and *length* shall be designated before *width.*

Width always shall be the dimension parallel to the top deck boards.

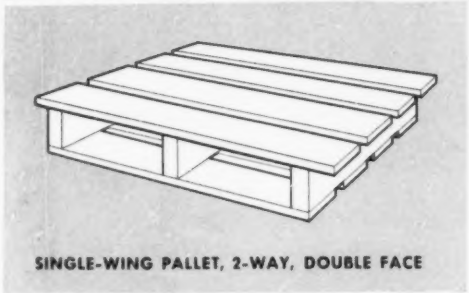
### *Species*

Groups I, II, III, and IV woods give equally acceptable performance for wooden-pallet construction.

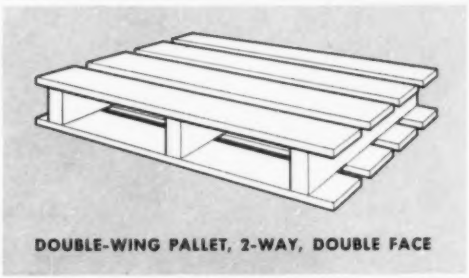
Lumber shall be free from decay and from knots with an average diameter greater than one-third the width of the board. No piece shall contain any defect that materially weakens it or hinders its proper fastening.



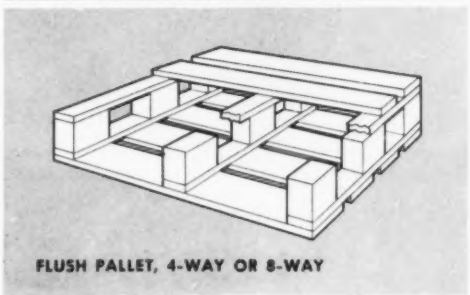
FLUSH PALLET, 2-WAY, SINGLE FACE



SINGLE-WING PALLET, 2-WAY, DOUBLE FACE

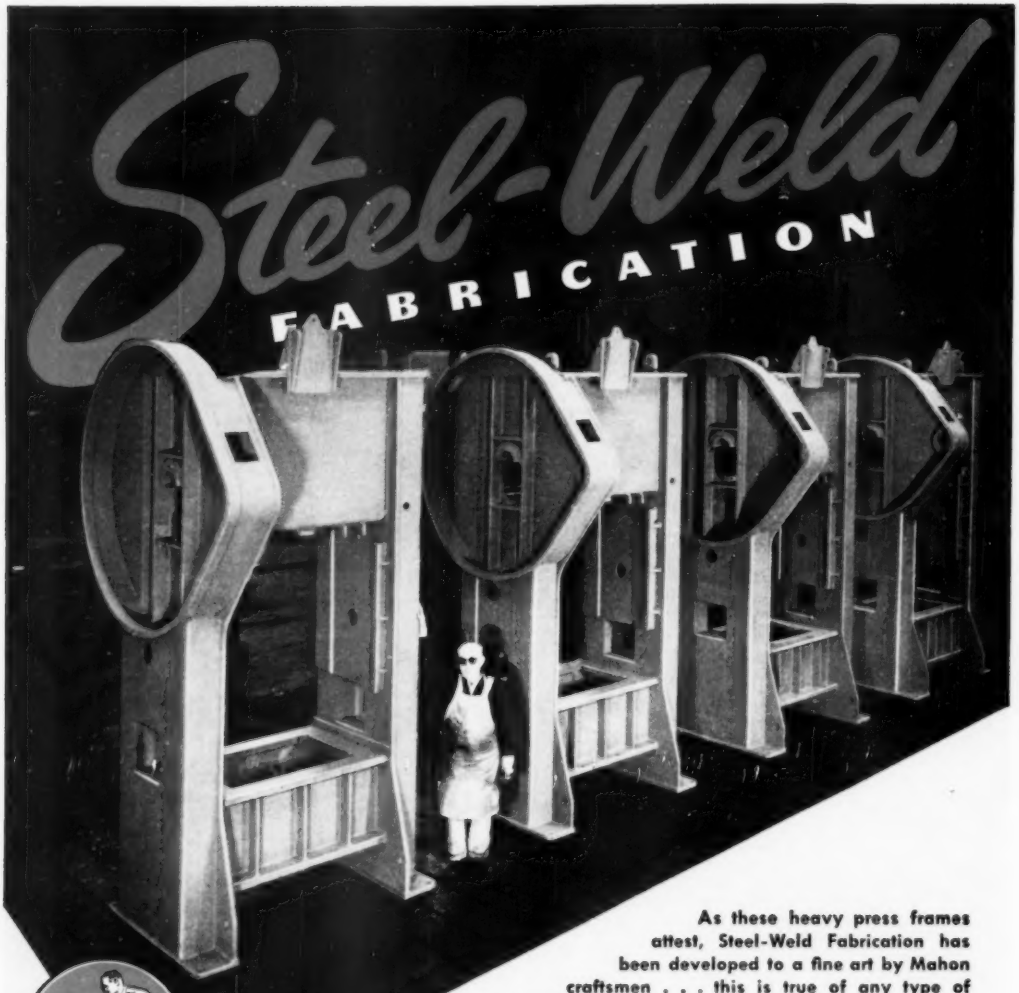


DOUBLE-WING PALLET, 2-WAY, DOUBLE FACE



FLUSH PALLET, 4-WAY OR 8-WAY

# Steel-Weld FABRICATION



As these heavy press frames attest, Steel-Weld Fabrication has been developed to a fine art by Mahon craftsmen . . . this is true of any type of welded steel base, frame, or heavy machinery part produced in the Mahon plant, regardless of size, shape or weight. The Mahon organization is also fully equipped to handle heavy machine work of all types up to unusual dimensions. These facilities and highly skilled craftsmen, backed by a staff of design engineering experts, assure you of a source which will produce for you a better, smoother appearing job, embodying every advantage of Steel-Weld Fabrication.

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*Engineers and Fabricators of Welded Steel Machine Bases and Frames, and Many Other Welded Steel Products*

# MAHON

# Specifications for Wooden Pallets...II

## COMMON WOODS FOR PALLETS

### Group I

| | | |
|---|---|---|
| Aspen (popple) | Cypress | Pine, ponderosa (western yellow) |
| Basswood | Fir, alpine | Pine, red (Norway) |
| Buckeye | Fir, balsam | Pine, sugar |
| Butternut | Fir, noble | Pine, white |
| Cedar | Fir, white | Redwood |
| Chestnut | Magnolia | Spruce |
| Cottonwood | Pine, jack | Yellow poplar |
| Cucumbertree | Pine, lodgepole | |

### Group II

| | |
|---|---|
| Douglas fir | Larch (tamarack) |
| Hemlock | Pine, southern |

### Group III

| | |
|---|---|
| Ash, black | Maple, soft |
| Ash, pumpkin | Sweetgum (red gum) |
| Blackgum | Sycamore |
| Elm, white | Tupelo, water |

### Group IV

| | |
|---|---|
| Ash, white | Hickory |
| Beech | Maple, hard |
| Birch | Oak |
| Elm, rock | Pecan |
| Hackberry | |

### *Moisture Content*

Wooden pallets may be manufactured of either seasoned or unseasoned lumber. In the manufacture of pallets, seasoned lumber shall be considered as that which does not exceed 20% moisture content at the time of shipment. Unseasoned lumber is that which exceeds 20% moisture content at the time of shipment.

### *Deck Boards*

The edge boards of the top and bottom decks shall not be less than 5⅝ in. wide. The balance of the deck boards may be random-width stock but none shall be less than 3⅝ in. wide.

The structural strength and life-span of a pallet are dependent on the lumber content of the top and bottom decks. Two factors in specifications govern this: (1) the amount of spacing between deck boards, and (2) the number of individual deck boards on each pallet face. Therefore, the inches of top and/or bottom deck boards, and the maximum individual and total spacing thereof, shall be specified.

The amount of lumber required for the deck boards in the pallet faces shall be in accordance with the accompanying tables.

When pallets are intended for use with hand pallet trucks, the space between the edge boards of the bottom deck and their adjacent deck boards shall not be less than 6¾ in.

All deck boards shall be smoothly surfaced on at least one side, and shall be of uniform thickness. The minimum thickness of deck boards shall be:

| Load | Thickness |
|---|---|
| 0—2000 lb. | Not less than 5/8 in. |
| 2001—3500 lb. | Not less than 25/32 in. |

Loads over 3,500 lb. shall be treated as requiring a *special purpose pallet.*

### *Stringers, Posts, and Columns*

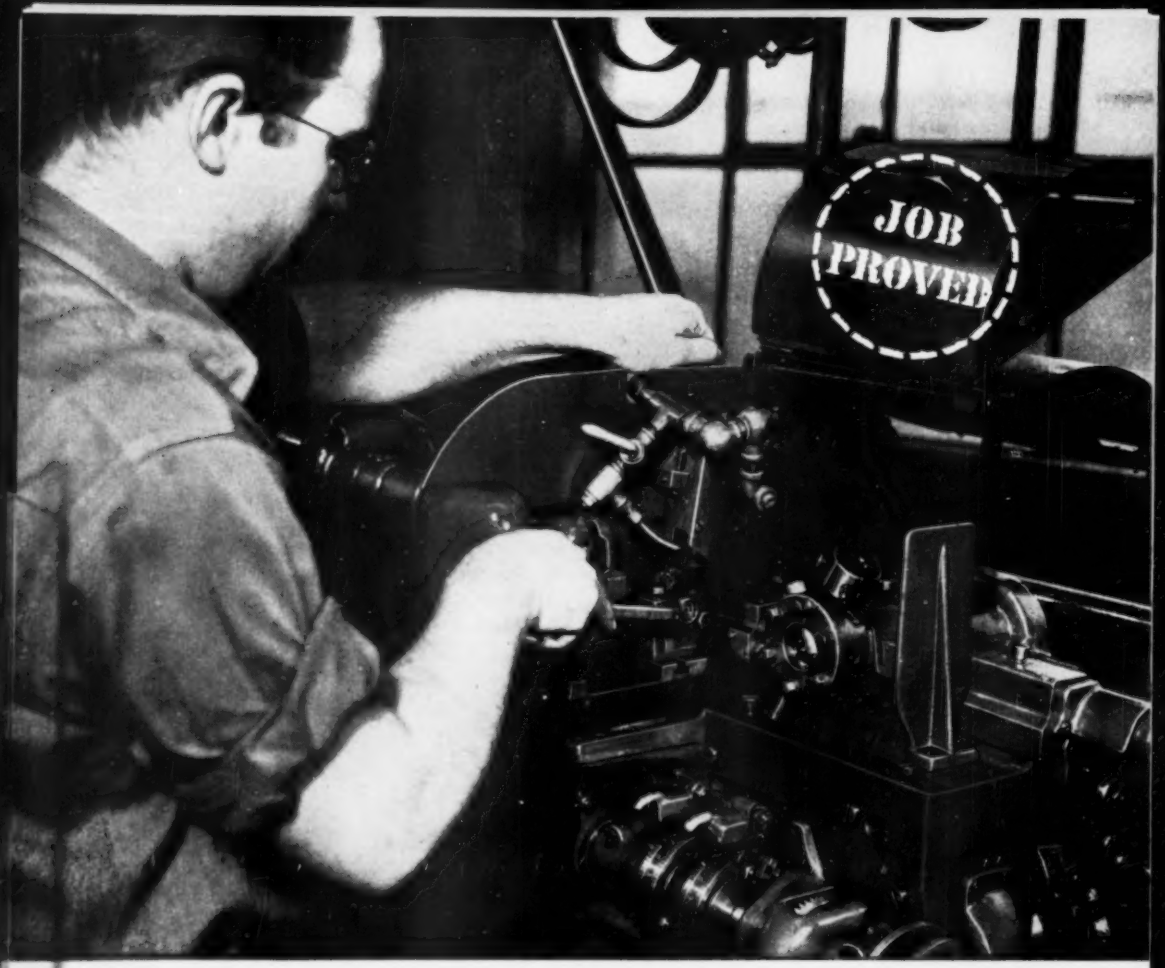
All pallets shall have not less than three (3) stringers or not less than nine (9) posts or columns. The

### Minimum Lumber Requirements for Pallet Decks Single-Face or Double-Face (Reversible)

| Stringer Length (In.) | TOTAL INCHES OF BOARD REQUIRED ON PALLET DECKS | | | | |
|---|---|---|---|---|---|
| | Deck Board Spacing (In.) | | | | |
| | 1 | 1½ | 2 | 2½ | 3 |
| 32 | 28 | 26 | 24 | 24 | 23 |
| 34 | 29 | 28 | 26 | 24 | 24 |
| 36 | 31 | 29 | 28 | 26 | 25 |
| 38 | 33 | 31 | 30 | 28 | 26 |
| 40 | 34 | 33 | 30 | 30 | 28 |
| 42 | 36 | 34 | 32 | 30 | 30 |
| 44 | 38 | 36 | 34 | 32 | 30 |
| 46 | 39 | 37 | 34 | 34 | 31 |
| 48 | 41 | 39 | 36 | 34 | 33 |
| 50 | 43 | 41 | 38 | 36 | 34 |
| 52 | 44 | 42 | 40 | 38 | 36 |
| 54 | 47 | 44 | 41 | 39 | 36 |
| 56 | 50 | 47 | 43 | 39 | 38 |
| 58 | 52 | 48 | 45 | 41 | 39 |
| 60 | 52 | 49 | 46 | 44 | 40 |

### Minimum Lumber Requirements for Pallet Decks Bottom Deck of Non-Reversible Pallets

| Stringer Length (In.) | TOTAL INCHES OF BOARD REQUIRED ON PALLET DECKS | | | | |
|---|---|---|---|---|---|
| | Deck Board Spacing (In.) | | | | |
| | 1 | 1½ | 2 | 2½ | 3 |
| 32 | 16 | 16 | 16 | 16 | 16 |
| 34 | 17 | 17 | 17 | 17 | 17 |
| 36 | 19 | 19 | 19 | 19 | 19 |
| 38 | 20 | 20 | 20 | 20 | 20 |
| 40 | 22 | 22 | 21 | 21 | 20 |
| 42 | 25 | 25 | 23 | 23 | 22 |
| 44 | 25 | 25 | 25 | 25 | 25 |
| 46 | 27 | 26 | 25 | 25 | 25 |
| 48 | 29 | 28 | 27 | 26 | 25 |
| 50 | 30 | 29 | 29 | 28 | 27 |
| 52 | 32 | 31 | 29 | 29 | 28 |
| 54 | 34 | 33 | 32 | 31 | 30 |
| 56 | 35 | 34 | 33 | 32 | 30 |
| 58 | 37 | 35 | 34 | 34 | 32 |
| 60 | 39 | 37 | 35 | 34 | 33 |




# TOOL LIFE TRIPLED

## Sunicut with Petrofac* Improves Finishes and Lengthens Tool Life in Intricate Machining Job

In the machining of small parts for radios, a shop was using a dark cutting oil with poor results. Finishes were rough, tool life was unsatisfactory. The dark oil made the work hard to see.

Changing to Sunicut with Petrofac, the plant found the ideal oil for its purpose. Its cooling and lubricating qualities are producing excellent finishes, and increasing tool life from 10 hours to 30 hours. Further, machinists can see the work better through this transparent oil.

**Job:** Turning, forming, threading, pointing
**Machine:** Brown & Sharpe OOG Automatic
**Part:** Stud pulley for radio
**Material:** B 1112 steel
**Tools:** Rex AA high-speed circular form tools
**Spindle Speed:** 2,600 R.P.M.
**Cutting Speed:** 165 S.F.P.M.

These new grades of Sunicut with Petrofac are making possible better finishes than ever, and faster work in a wide range of operations. The new Sunicut grades with Petrofac possess superior metal-wetting, anti-weld, and extreme-pressure qualities. They are not blended with animal or vegetable fatty oils—cannot turn rancid. For additional information about the various Sunicut cutting oils, write for folder AM-4.

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**"JOB PROVED" IN EVERY INDUSTRY**

SUNOCO

# Specifications for Wooden Pallets...III

minimum dimensions of the stringers shall be 1⅝ in. thick by 3⅝ in. wide after surfacing.

Stringers shall be surfaced or smooth sawn at least on the top and bottom edges to uniform dimension. The outside stringers shall be surfaced on the outside face in addition to the top and bottom edges.

### Chamfering

Unless otherwise specified by the purchaser, only the outside edges of the bottom edge deck boards shall be chamfered. Chamfers shall be at least 12 in. long, and shall be cut on a 45° angle to leave a face adjacent to the chamfer not less than ¼ in. from the outer edge of the deck board.

### Tolerances

The over-all length and width of the pallet shall be subject to a tolerance of ¼ in. plus or minus.

Where minimum specifications are specified, no minus tolerances shall be permitted.

### Fastenings

Acceptable fastenings for wooden pallets are standard nails, annular ring (fettering) nails, drive screws, and bolts and nuts. Bolt and nut fastenings are the most durable and effective, with drive screws and annular ring (fettering) nails the next strongest method. The least effective fastening is the standard cement-coated nail.

Pallets should be assembled in accordance with the following schedule:

### Bolts and Nuts

Standard steel carriage bolts or car bolts can be used in any one of three styles: standard, slotted, or large head. Unless otherwise specified, these bolts should be furnished in the coarse-thread series, Class 2, free fit.

When ordinary standard commercial carriage bolts are employed, flat washers should be used under the head. If car bolts or other bolts with fin construction under the head are used, washers under the head are not necessary.

Bolt holes drilled through deck boards shall be ⅛ in. larger in diameter than the part itself, and holes drilled through the stringer shall be at least 1/16 in. larger in diameter than the bolt column.

Square or hex commercial nuts may be used. Threads should be the same as the bolts, and the nut bearing surface should be washer faced with flat washers and lock washers, or it should be double chamfered.

For permanent and enduring use "Teenuts" or "HY-C" nuts are recommended. No flat and locking washers are required, and when used in deck boards of softwood or unseasoned hardwood, no counterboring is required. With seasoned hardwood, the deck boards should be counterbored not more than 3/32 in. deep.

Outside edge deck boards shall have at least two bolt and nut combinations at each end, and at least one bolt and nut combination at any center bearing points. All random-width deck boards shall have at least one bolt and nut combination at each of their bearing points. The correct size of "Teenuts" and "HY-C" nuts for the various pallet loads are as follows:

| Load (lb.) | Size of Nut |
|---|---|
| 0—2500 | 5/16—18 |
| 2501—4000 | ⅜ —16 |
| Over 4000 | ½ —13 |

### Drive Screws

For ⅝-in. and 25/32-in. thick deck boards, it is recommended that a 2-½ in. No. 6 flat head, chisel-point, cement-coated or chemically etched drive screw be employed.

The correct number of drive screws to be employed *at all bearing points* for the various widths of deck boards is as follows:

| Board Width (In.) | Drive Screws |
|---|---|
| 3⅝—4½ | 2 |
| 4⅝—6¾ | 3 |
| 6⅞—9 | 4 |
| 9⅛—11 | 5 |
| 11⅛—12 | 6 |

When a deck board exceeding 5-in. nominal width covers a stringer notch, one less drive screw shall be used.

To prevent splitting and to provide greater holding power, drive screws shall be staggered. Where possible all drive screws shall be countersunk approximately 1/32 in.

For flush stringer pallets when Groups III or IV woods are employed, outside edges of deck boards shall be drilled to receive the drive screws. Drill diameter shall be at least 1/32 in. less than the drive-screw shank.

### Annular Ring (Fettering) Nails

For ⅝-in. and 25/32-in. thick deck boards, it is recommended that a 10 wire gage x 2½ in. annular ring (fettering) nail be employed.

Other specifications are the same as those for drive screws.

### Standard Nails

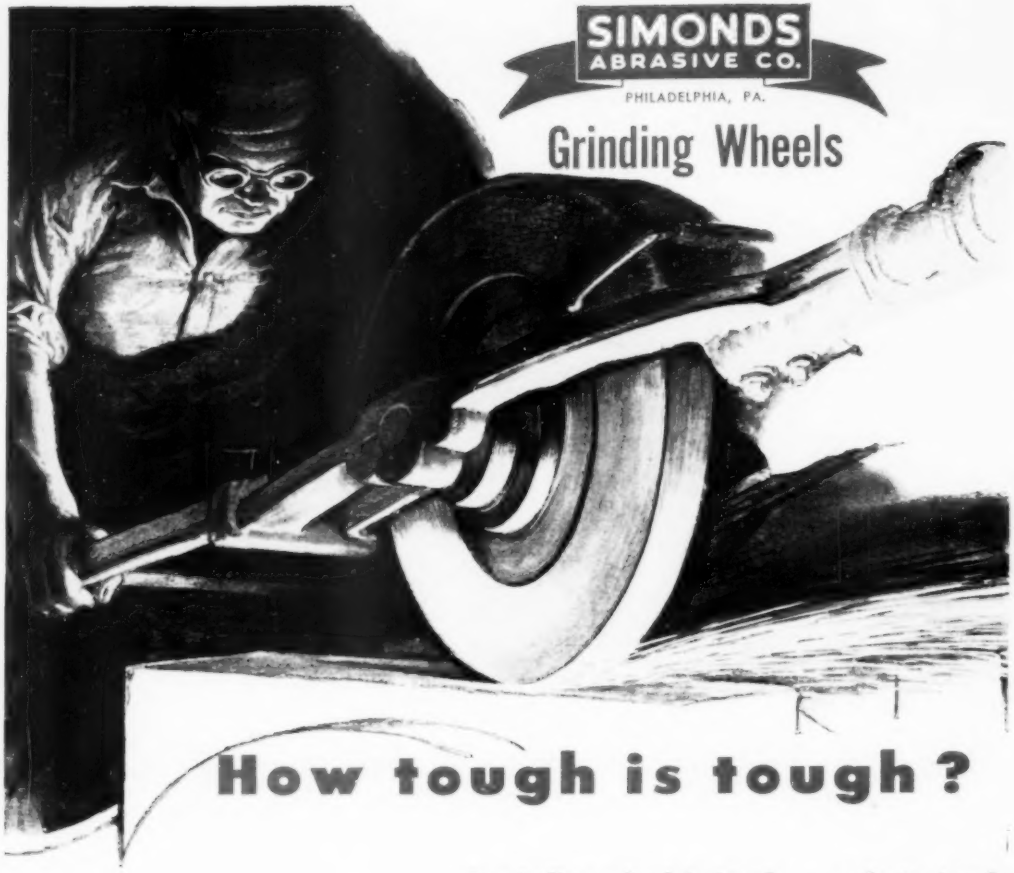
All standard or regular nails shall be either cement-coated or chemically etched box-type nails.

The following size box nails shall be employed for the various thicknesses of deck boards and types of wood:

| Thickness | Group I-II | Group III-IV |
|---|---|---|
| ⅝ in. | 7d | 6d |
| 25/32 in. | 8d | 8d |

The correct number of nails is the same as that specified for drive screws.

All nails shall be staggered and where possible shall be countersunk approximately 1/32 in.



SIMONDS
ABRASIVE CO.
PHILADELPHIA, PA.

Grinding Wheels

# How tough is tough?

**A grinding wheel is tough . . . plenty tough when it takes the severest operating use at 9,500 surface feet per minute . . . yet cuts fast and stands up to give you lowest wheel cost per pound of metal removed.**

**That's what you get from Simonds Abrasive Co. Snagging Wheels for cleaning castings and billets . . . as well as from other kinds of Simonds Abrasive Wheels used in the precision grinding field.**

**Send for your copy of our Grinding Wheel Data Book giving complete information including recommendation tables and address of nearest distributor equipped to serve you locally.**

**SIMONDS ABRASIVE COMPANY, PHILADELPHIA 37, PA. DISTRIBUTORS IN PRINCIPAL CITIES**

# TALKING SHOP

### Hot Trumpet

NEXT TIME the Rebuilt Rib says she's tired of talking, tell her that she'd have to talk 20,000 years (in a normal tone of voice) to produce enough energy to heat a cup of coffee. A trumpet puts out about a third of a watt in energy, a full orchestra about 50 watts, but the sound-vibration generator at Penn State College produces as much as 2000 watts. An electromagnetic coil, acting on a steel diaphragm driving a solid aluminum bar, vibrates the bar vertically as fast as 3,200 times per second. That creates enough sound energy to cave in the stomach of a fly or shatter the wings of a bee.

### Metering Production

WATTHOUR METERS are being applied extensively to machine tools, to determine machine utilization and for production-control purposes. They show not only how long a machine is working, but also whether its load is as high as it should be.

### Fractography

DR. CARL ZAPFFE of Baltimore has developed a new microscope technique for studying mechanical properties of tungsten. Called "fractography," it magnifies the inside of metal grains up to several thousand times so conclusions can be drawn regarding the atomic architecture of the metal as it relates to fracture. This permits control of metal structure for high-heat parts like those used in jet engines and rockets. The work is sponsored by the Office of Naval Research . . . Dr. Zapffe also says the small hard spots which cause so much trouble in machining cast iron are the result of collection of tiny amounts of invisible hydrogen gas within the metal. The cure is to keep moisture away from the furnace and molds, or washing the hydrogen out before casting by bubbling through the molten metal an inert gas like helium.

### Caseless Transformers

THE LATEST in transformers, for inside or outside application, has the coils molded in butyl rubber. This makes conventional wrapping and casing unnecessary. Butyl stands weathering, abrasion and similar wear excellently, reduces production cost markedly.

### Builtup Flywheel

FOR A NEW LIGHT-CAR torque converter, flywheels are flat ⅛-in. disks with the starter ring gear forming a welded-on rim. The converter is bolted on through holes near the disk rim, and the disk is relieved somewhat between holes. Welds are made just outside bolt holes.

### Tool Support

G.E. is moving into its new 650x 1290-ft. turbine plant, covering 20 acres and having 1,027,986 sq. ft. of floor space. Because it is built on sands, silts and clays deposited by the Mohawk River, the plant structure (and cranes, some weighing 400 tons loaded) are supported on 4700 steel H-beam piles, 80 to 140 ft. long, which weigh 13,300 tons. The welded building itself is only 14,800 tons of steel.

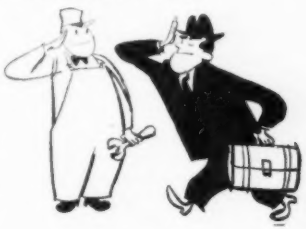
Incidentally, 1700 concrete pedestal piles 50 ft. long support lighter building columns and smaller machine tools. Heavy machine tools are supported in an unusual way to permit mobility. A 16-in. concrete mat 7 ft. below floor level is laid over about two acres of piles on 8-ft. centers. Over the mat is very fine crushed stone topped by a 10-in. reinforced-concrete floor slab covered with 2-in. wood blocks. This provides a stable base for all but the heaviest tools—which have individual foundations extending through both mats and on their own piles. Heaviest of these tools is a 40-ft. boring mill which will cost five times as much to move as it did to build—but would cost seven times that to replace—or 35 times its original cost.

The new shop contains nine machinery bays, 60 to 80 ft. wide and the length of the plant so material flow is unidirectional. There is also a central, 3-story, 40-ft. service bay to house lockers, 9 substations and equipment like the blowers which provide 150 million cu. ft. of filtered (and heated in winter) air through 8½ miles of ducts to the manufacturing area. There are 51 traveling cranes (½-ton to 200-ton) including two 75-ft.-span gantries, plus 95 jib cranes. In the three large bays, cranes are at two levels, to give a maximum hook height of 61 ft. Lighting load will be 4000 kw., machine-tool power load 20,000 kw.

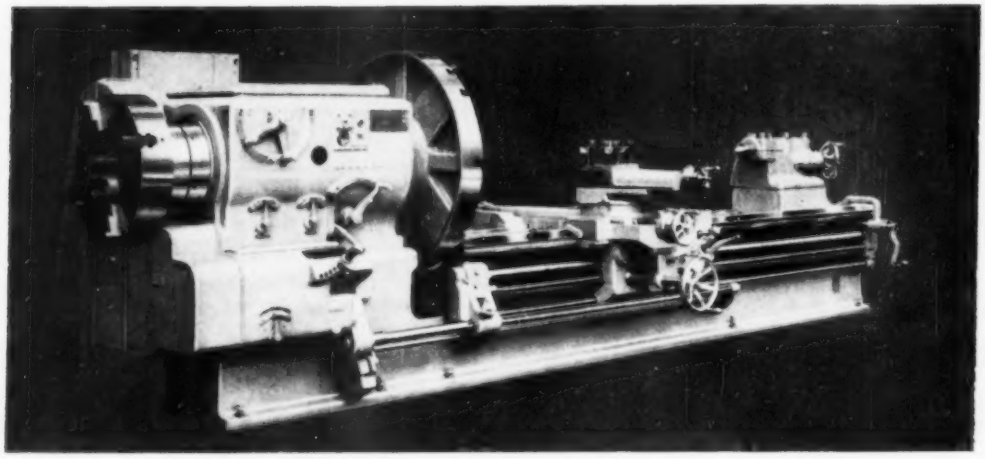
With a 71,000-sq. ft., 4-story, air-conditioned, stainless-paneled office building across the front, the plant will employ 5,000 people, produce turbines enough each month to light a city of a million people.

### Nineteen Guns

BACK IN 1914, Congress was debating the use of time study in Navy shops and there was general hullaballoo about costs. Now, when costs are again a subject, it might be time to recall the *A.M.* editorial of July 30, 1914, regarding "Efficiency in the Navy Department." Even 25 years ago, we pointed out that the firing of salutes and the other folderal that accompanies an Admiral's visit to a ship is a waste of good money. It takes time, men from other duties, delays operations, to have the right kind of barge, proper uniforms, and fire a 19-gun salute. If shops did the equivalent each time the general manager visited, we'd build tradition but massacre efficiency.



# New Shop Equipment



This combination lathe offers an extension gap opening up to 5 ft.

## Sliding-Bed Gap and Hollow Spindle Combined on LeBlond 27-in. Lathe

*The R. K. LeBlond Machine Tool Co., Cincinnati 8, Ohio*

The LeBlond 25-in./50-in. sliding-bed gap, and the 27-in. hollow-spindle lathes have been combined into one machine with a swing capacity of 60½ in. within a 5-ft.-wide gap, and with a spindle hole of 12½ in.

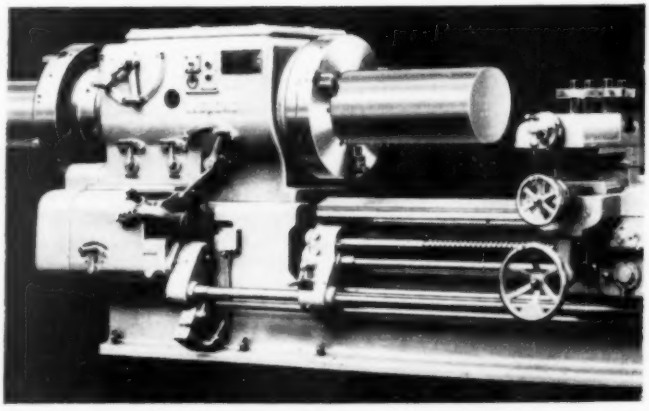
A totally inclosed, automatically lubricated quick-change box is offered as well as a geared headstock with heat-treated steel gears. The carriage permits facing the full swing of the gap. Large-bore chucks can be fitted to both ends of the hollow spindle, and faceplates can be mounted on the flange-type spindle nose.

Detachable levers move tailstock and upper bed. Standard accessories and attachments broaden capacity of the lathe.

The bed of the sliding-bed gap lathe is built in two sections: the top bed being movable on the lower by means of a heavy, coarse pitch screw. A "V" on the lower bed keeps both beds in positive alignment and two heavy clamps hold them in position. Thus the upper bed can be adjusted to any width of gap within lathe capacity.

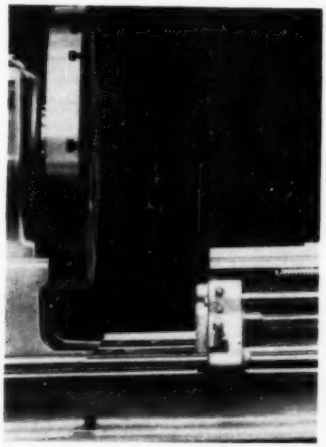
The large hole through the spindle on the hollow-spindle lathe permits machining long and bulky oil-drilling equipment. All other component parts of this lathe are similar in construction and operation to those used on LeBlond's standard heavy-duty engine lathes.

Specifications for the lathe are:



Large stock can be accommodated through the 12½-in. hole in the spindle. Large-bore chucks fitted to both ends of the spindle hold work securely

# Materials and Parts



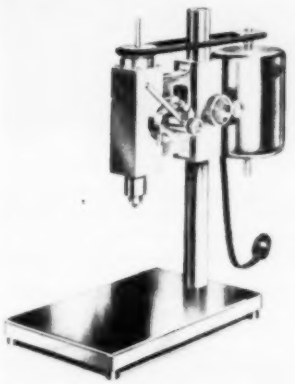
A faceplate can be mounted on the flanged spindle nose. The upper bed is shown extended

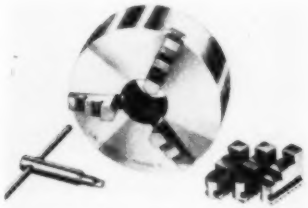
swing over bed and carriage wings, 33½ in.; swing over gap, 60½ in.; distance between centers—base length bed—8 ft.; distance between centers—base length bed—extended, 13 ft.; spindle-hole size 12½ in.; spindle speeds, number, 12; spindle speeds range, 5-213 rpm.; spindle speeds, range with 2-speed motor, 2½ to 213 rpm.; motor recommended, 25/12½ hp. 1200/600 rpm.

stead of the usual single pinion. The body is a semi-steel casting with a highly ground finish. The hardened jaws with ground steps assure a tight grip. The chuck can be used on any lathe having a 1½-in. 8-thread spindle, including most models of Atlas, South Bend, Logan and Clausing.

By the use of a conventional back adapter plate the chuck also mounts on any size and type lathe. It also is ready for mounting on the L-W 6½-in. SD dividing head.

Also offered are extra-sturdy 6-in. and 8-in. independent 4-jaw chucks with reversible jaws.





## 5-in. Universal Chuck Features Three Separate Pinions

*L-W Chuck Co., 25 S. St. Clair, Toledo, Ohio*

A 5-in. medium-duty universal chuck has two sets of jaws, features three separate pinions in-

## Cobb 6-in. Drillpress Takes Drills to 5/32 in.

*Cobb Precision Co., 6664 Lexington Ave., Hollywood 38, Calif.*

A 6-in. drillpress taking drills from No. 0 to 5/32 in. uses a standard Jacobs chuck. Adjustable clearance from chuck to fixed table base is 0 to 7 in. Spindle feed is 1 in. and over-all height is 12 in. All parts are machined dural or stainless steel except the base which is ⅝-in. cold rolled steel with a machine-ground surface. A foot-operated rheostat control permits speed to be adjusted from 6000 rpm. down to zero. A detachable 1/10-hp. double-sealed ball-bearing ac.-dc. motor is employed.

### ...INCLUDING


**Shielded-arc welder** for high-frequency operation, FCC approved, operates on assigned frequency.....page 136

**Power squaring shear** has a floating driven gear which separates clutch jaws completely when idling .....page 137

**Thin Jaw clamps** hold work as thin as 1 in., cutter can pass safely over clamps .....page 138

**Cutter-grinding fixture** provides automatic 180° indexing. Can be disconnected for conventional cutter grinding.....page 140

**Nut retainer** holds square nuts to sheet-metal panels, applied by hand or screwdriver....page 142

**Keyway broach** supports itself in the hole, requires no guide, cuts keyway in one pass....page 144

**Hardness tester** applies loads as light as 1 gram with either Knoop or Vickers indenter....page 146

*New Bulletins for your shop library — after page 180*

***...and in MAY 5***

**Single-spindle screw machine** has electric feed drive for infinite adjustment without cam changes.

**Abrasive-belt** roll grinder traverses belt across revolving roll, either in machine or out.

**Electronic** surface comparator checks and meters surfaces against standard.

## High-Frequency Welder Eliminates Communications Interference

*National Cylinder Gas Co., 840 North Michigan Ave., Chicago 11, Ill.*

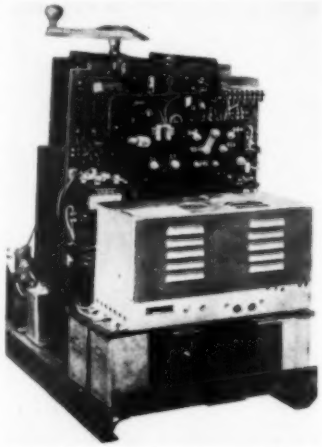
Approval for the Sureweld Gasarc high-frequency welder was granted by the Federal Communications Commission. This is the first instance of approval of such a welder by the FCC. The NCG oscillator and specially designed torch will keep the unit on its assigned frequency at all times and eliminates the problem of communications interference.

Regardless of working or weather conditions the Gasarc welder remains on the assigned frequency of 27,120 kilocycles. It causes no communications interference by either fundamental or harmonic radiation. The Gasarc oscillator is a full-wave, self-rectifying type using a single tube.

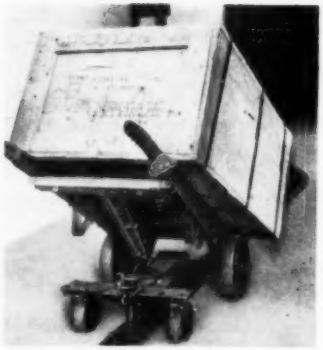
The new Gasarc torch also approved by the FCC is tuned to preserve freedom from interference while transferring high-frequency energy from the oscillator to the welding arc. The torch assembly uses coaxial cable for the high-frequency transmission.

The arc starting procedure provides automatic cold starting. The electrode is contacted with the work at the point where the weld is to begin. The welding operator can locate the starting point of the weld accurately because he can make this contact with his helmet raised. Touching the electrode to the work energizes a control circuit which turns on the high-frequency current. After lowering the helmet the operator withdraws the electrode. This automatically turns on the welding current and establishes the arc. Since no welding current will flow while the electrode is in contact with the work, sticking of electrodes is avoided. The torch offers flexible plastic cable providing passage for welding current, inert gas, high-frequency current and a circulating water supply for cooling the electrode holder.

The torch can be used for inert gas arc welding with the approved Sureweld Gasarc high-frequency welder



The self-contained Gasarc oscillator unit shown as part of the Sureweld Gasarc welder is available separately for use with other welding machines

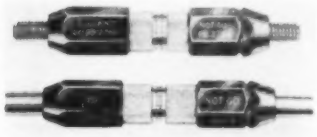


### Continuous Chain Conveyor Offers Chain Running in Slot Below Floor

*Jervis B. Webb Co., 8951 Alpine Ave., Detroit 4, Mich.*

The Webb "Towveyor" is a continuous-chain conveyor with the chain running in a steel slot below the floor. A towing pin device is bolted to the end of the standard four-wheel truck or trailer. Standard two-wheel trucks can be used with a dolly. Trucks are set in motion by dropping the pin into the slot.

One of the pusher dogs spaced at suitable intervals on the chain, engages the pin and moves the truck along the Towveyor route. Disengaging is just as easy by lifting the pin. The truck may be pushed away from the slot, handled as any hand-push truck. No part of the conveyor projects above the floor, hence there is nothing to interfere with other traffic.

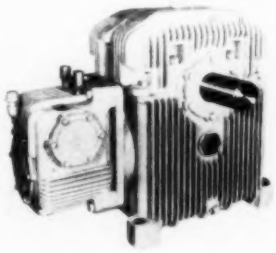


### Reversible Plug Gages Furnished As Cylindrical, Thread Plugs

*Pratt & Whitney, Div. Niles-Bement-Pond Co., West Hartford 1, Conn.*

A line of plug gages have reversible gaging members. When a member has worn below size, it can be replaced with the other end. Plug gages are regularly furnished as cylindrical or thread plugs. Cylindrical members are made to American-gage design standard in sizes from 0.030 in. to 0.510 in. in steel, chromium plate and carbide.

Thread gage members are furnished to X tolerance for checking NC and NF threads in sizes from 0 to ½ in. Other thread forms will be furnished on order. The P&W Pilot feature may be added to cylindrical members above 0.240 in. in diameter to facilitate easy entry into close-tolerance holes.



### Line of Double-Reduction Units Gives Over 86,000 Combinations

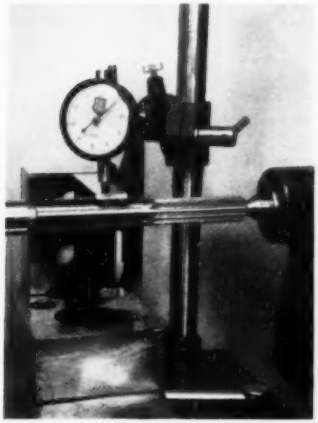
*Cone-Driver Division of Michigan Tool Co., 7171 E. McNichols Road, Detroit 12, Mich.*

By using standard speed reducers as primaries and secondaries, a new line of double-

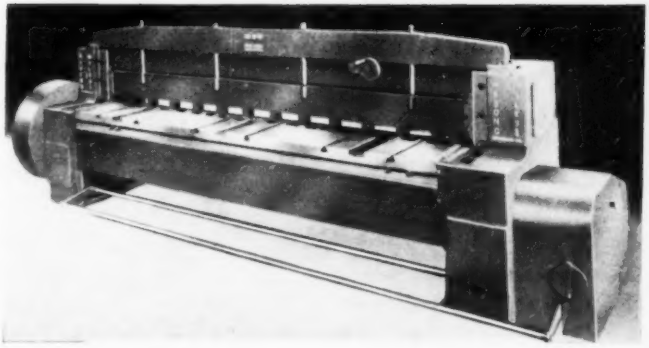
reduction units comprises over 86,000 combinations as to capacity, model and ratio. The combination of standard reducers provides models with input ratings of from ½ to 68 hp., from 4,000 to 244,000 in.-lb. output torque, and reduction ratios of from 25 to 1 to 4900 to 1.

Although the line provides some 86,000 possible combinations there are actually only five sizes of primary reducers and eight sizes of secondaries. Two of the primaries, 2½- and 3-in. center distance, can be combined with four of the secondaries, 4-in. to 7-in. center distance.

The three other primaries, 4-, 5- and 6-in. center distance go with the other four secondaries, 7- to 12-in. center distance. These center distances correspond to much larger sizes in conventional reducers due to the greater load-carrying capacity of the double-enveloping gearing used. A 3-in. center distance cone-drive primary can handle up to 9 hp. at 1750 rpm. at rated capacity, while a 12-in. reducer can handle up to a quarter million inch pounds of output torque.



**CHECKING PITCH DIAMETER RUNOUT** of threaded shafts is done without special equipment. The illustration shows the arrangement of the standard gages set up to check the concentricity of a ground thread on a tapping spindle. As the spindle is revolved the wires follow the lead of the thread and hold their longitudinal position against the face of the planer gage. When taking an indicator reading, best results are obtained by reversing the rotation of the spindle by a slight amount every third of a turn. *—The Cross Co., Detroit, Mich.*



## Wysong & Miles Power Squaring Shear Handles 10-ft. 10-gage Mild Steel

*Wysong and Miles Co., Greensboro, N. C.*

A power squaring shear is offered with a 10-ft., 10-gage capacity mild steel and is known as the Wysong and Miles No. 10-10. Bed, end-frames, knife-bar, holddown and top-girder are all one-piece castings. To insure accurate cutting, the bed is squared with the end frames in all three directions.

The 9-jaw clutch is built of hardened forged alloy steel. Clicking when idling is eliminated by a floating driven gear which causes the clutch jaws to separate completely.

A non-repeat unit is built into the clutch. It can be set for continuous- or single-stroke shearing by pulling out and turning a plunger. The knife-bar brake is cam-operated and engages only when the knife-bar is at the top of the cycle. A front-operated, ball-bearing parallel back gage is adjustable to 0.0078 in. by turning a handwheel. Other standard equipment includes standard alloy blades with four cutting edges, three front gage brackets, steel front gage, a 7½-hp. motor and all electrical equipment.

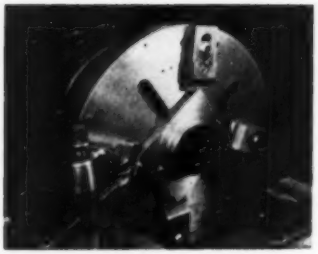
Ways for holddown and knife-bar travel are accurately machined from steel and hand scraped for perfect bearing so that travel is true and neither can rock or deflect. The machine is made of semi-steel cast in the Wysong and Miles factory.

### Wedge-Layer Polishing Wheels Eliminate Scratching, Gouging

*Greene, Tweed & Co., North Wales, Pa.*

A wedge-layer Walrus polishing wheel eliminates abrasive injury in fine finishing. Surface scratch is said to be minimized by the Tusko laminated Walrus polishing wheel in the use of strong-but-soft cement. Scratch is removed through the wheel's wedge-layer design. Layers are set at an angle. Thus when the wheel revolves the joint areas weave from side to side of the wheel. This enables the leather to pick up and wipe off any are a transversed by the joint areas removing any cement scratch and smoothing the surface clean.

Wheels can be supplied in any diameter. They are especially adaptable to the finishing of copper, nickel, German silver and stainless steels, to the burnishing of unevenly shaped objects, and to working inside wide-mouthed objects. Wheels are supplied in thicknesses up to and including ⅞ in.



## All-Purpose Jaw Clamps Help Controlled Centering Adjustment

*J & S Tool Co., Inc., 477 Main St., East Orange, N. J.*

The J & S jaw clamp is designed for holding almost every size and shape of workpiece quickly and firmly against the faceplate or table of a machine. No part of the clamp is higher than 15/16 in. making it possible to pass over the whole clamp when holding work 1 in. high or more. The full surface of work $\frac{3}{8}$ in. high or over may be machined as illustrated as the jaw is only 23/64 in. thick.

The clamp facilitates controlled centering adjustment on the clamped workpiece and eliminates secondary operations. It can be used in machining operations on lathes, planers, milling machines, drillpresses and other machine tools. As the clamp does not protrude above any part of a workpiece over $\frac{3}{8}$ in. thick, it does not interfere with the reading of the indicator dial of vertical boring and milling machines.

The all-purpose jaw clamp is sold in sets of four clamps, including standard socket wrenches, hardened T-slot nuts, $\frac{1}{2}$-13 special bolts and hardened washers. Price f.o.b. East Orange, N. J. per set of four is $29.75.

## Six Chemicals Derived from OXO Process Offered by Rohm & Haas

*Rohm & Haas Co., Dept. SP, Washington Square, Philadelphia 5, Pa.*

Six new chemicals derived from the OXO process include nonanoic acid, nonylamine, nonyl aldehyde cyanohydrin, alpha-hydroxydecanoic acid, octadecenyl, aldehyde, octadecyl alcohol.

A pilot plant has been constructed for preparing aldehydes catalytically by the OXO process from those common hydrocarbons known as olefins, carbon monoxide and hydrogen. In the field of metal cutting this development offers among others the possibility of new lubricants. Octadecyl alcohol, a liquid high-molecular-weight alcohol, may be of interest as a lubricant for metal cutting and plastics molding, softener and lubricant for textiles, anti-foaming agent, plasticizer and solvent.

## Variable-Feed Wick Oiler Has Removable Wick Retainer

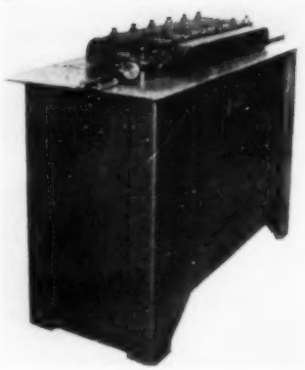
*Trico Fuse Mfg. Co., 2948 N. 5th St., Milwaukee 12, Wis.*

A variable-feed wick oiler with removable wick retainer has been recommended for any equipment having solid bearings oiled from the top, where a measured quantity of filtered oil is desirable. The feed of the oil is controlled by varying the size of the wick embodied in the tamper-proof base fitting. A crystal-clear, shatterproof plastic bottle keeps the oil supply visible. The oiler is available in four types—with or without sight-fitting, with or without feed shut-off, and in 1-, 2-, 4- and 8-oz. capacities in each type. Five wicks of graduated delivery capacity are furnished with each oiler.

## Chem-Peel Plastic Emulsion Gives a Strippable Coating

*Chemclean Products Corp., 64 Sixth Ave., New York 13, N. Y.*

Protective coating called Chem-Peel is a plastic emulsion that can be applied either by spraying or dipping and imparts to the surface so treated a film of plastic which can be removed by simply peeling. It is claimed to be about 40% less expensive than similar materials sold for this purpose.



LOCK-FORMING MACHINE, the Model 20, features four sets of lock-forming rolls. The six-stage lock-forming units form Pittsburgh lock, double seam, flat S cleat and drive cleat, respectively, in a single pass. The Flagler 20 makes Pittsburgh locks in 20- to 26-gage metal inclusive, using approximately 1 in. of material. Unit is powered by 110-220 volts, $\frac{3}{4}$-hp. motor with V-belt drive.—*Flagler Mfg. Co., Detroit 12, Mich.*

## Tyler Band Saw with Spiral Blade Cuts Steel, Plastic, Foam Rubber

*Tyler Manufacturing Co., 6151 West 98th St., Los Angeles 45, Calif.*

The Tyler band saw with a spiral blade cuts steel, plastics and foam rubber. The Tyler band saw is said to cut any line that can be drawn. The blade presents a 360° cutting edge that cuts smoothly in any direction. The infinite speeds planetary transmission provides a saw speed range of from 70 fpm. for steel and other tough metals, to 5000 fpm. for wood, aluminum and other light materials. The operator has a choice of any speed in this range. Any pattern can be cut without turning the work.

# No Spoilage in Production...

# No Spoilage of Sales...

*"TROPITAN" Furniture by Ritts Co., Los Angeles, Cal.

## ...when AMERICAN PHILLIPS SCREWS are used to fasten fine furniture like this*

**"EASY CHAIRS" TO BUILD:** Take a look at this handsome living room. How would *you* like to try building furniture like *that*, with wobbly screws and slipping, slashing drivers? Well, neither would the builders of this visibly top-quality line. So they play safe. They use American Phillips Screws *instead of binding the frame together*, . . . and haven't a worry in the world about cost, spoilage, or complications in production. In fact, they guarantee the frame for life.

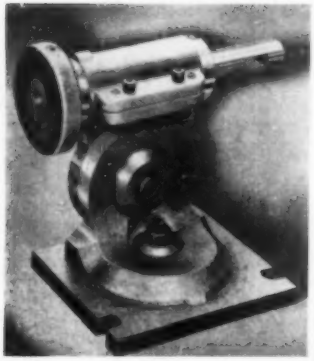
**"EASY CHAIRS" TO SELL:** Nor do they have any worry about their ultra-modern designs being spoiled by old-fashioned, ugly, slotted screws . . . nor about any burred screwheads left to injure customers and clothes and spoil repeat sales. For against all these former threats, they now have American Phillips Protection at every fastening point. Now, how about *you?* What fastening worries do *you* have? *Write.*

**American Screw Co., Providence 1, R. I.; Chicago 11: 589 E. Illinois St.; Detroit 2: 502 Stephenson Bldg.**

4-WINGED DRIVER CAN'T SLIP OUT OF PHILLIPS TAPERED RECESS

# AMERICAN PHILLIPS *Screws*

**ALL TYPES**
**ALL METALS: Steel, Brass, Bronze, Stainless Steel, Aluminum, Monel, Everdur (silicon bronze)**

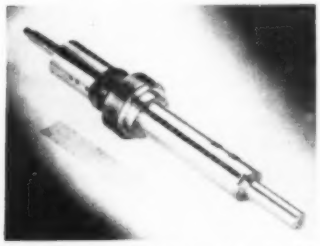


## Madison Cutter Grinding Fixture Offers Automatic 180° Indexing

*Madison Manufacturing Co., Muskegon, Mich.*

A cutter grinding fixture, accommodates a variety of run-of-the-shop grinding jobs. It has been used to grind cutting edges, steps, flutes and chip relief on Madison roughing and reaming cutters, milling cutters, chamfering tools, turning tools and reamers.

The grinding fixture is graduated in degrees in all three planes. It offers automatic indexing for Madison tools and any others where 180° indexing is required. The automatic indexing feature can be released for conventional handling of other tools. Arbors for all sizes of Madison cutters, both roughing and reaming, for single point tools, and for milling cutters are available. Special arbors may be obtained. The fixture is priced at $75.00 list.



## Large Automatic Recessing Tool Offered for Radial Drills

*The Maxwell Co., 300 Broadway, Bedford, Ohio*

A large-size automatic recessing tool is designed especially for use on radial drills, boring mills and large boring machines as well as drillpresses. The tool employs the same standard Max-WELL rack- and gear-operating mechanism as used in the smaller tools of the same line.

Because of the ball-bearing loaded pilot feature, the tool can be used in conjunction with existing fixtures. If fixtures are not used, the tool collar will stop on the workpiece surface to accurately locate the cutters and the subsequent recesses. Cutter feeds can be furnished in a ratio of approximately 1:3 as compared to the spindle speed.

## Minute Man Collared Bushings Help Locate Broach in Bushing

*The du Mont Corp., Greenfield, Mass.*

Collared bushings are offered for use with Minute Man keyway broaches in sizes from ¼ to 1 9/16 in. Larger sizes are available on special order. The collared bushing makes it easy to locate the broach in the bushing and makes it unnecessary to locate the base of the bushing on the arbor press plate. The collar also prevents the bushing from dropping through the bore after the broach has been pushed through.

## Carbide-Tipped End Mills Are Offered with Holders

*Lovejoy Tool Co., Inc., Springfield, Vt.*

A line of carbide-tipped end mills and suitable holders is announced. The positive-locking device is used to hold the mills immoveably in the holder, while allowing end-wise adjustment and quick change of cutters. An alternate adjusting shoe adapts the cutters to standard set-screw type holders.

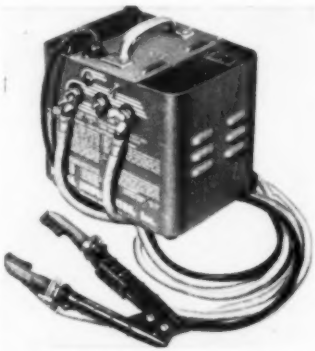
Two-flute end mills are stocked in diameters from ½ to 1 in. and four-flute mills from ¾ in. to 2 in. All end mills have 1-in. diameter shanks, and are available for cutting cast iron or steel. One-flute end mills, 1-in. in diameter, are available for use when low cost and ease of sharpening are primary considerations. Holders come with No. 4, 5, 6 and 7 Morse Tapers, No. 7, 8, and 9 B & S Tapers, and No. 40 and 50 N.M.T.B. adapters.

## Line of Oil-Hydraulic Presses Offers 1- to 35-ton Capacity

*The Denison Engineering Co., Columbus, Ohio*

Standardized line of 1- to 35-ton oil-hydraulic presses are now available in seven standard sizes in a compact frame, each of which is designed for specific dimensional and tonnage requirements. Three groups of elements interchangeable to a degree make up the major operating components within the Multipress oil-hydraulic press frames.

Cylinders have pistons from 1½- to 4¾-in. dia., rams from ⅞- to 3¼-in. dia., and ram strokes of maximum lengths from 6 in. to 15 in. Ram speeds for closing are offered from 220 to 1300 ipm., pressing from 80 to 570 ipm., and return from 130 to 920 ipm. Power assemblies have electric motors from 1½ to 30 hp. and hydraulic pumps with capacities from 2 to 20 gpm. that provide maximum operating pressures from 970 to 3950 psi. A choice of ten different types of control valves for manual or automatic press operations is available.



## Resistance-Heat Soldering Tool Heats Parts Almost Instantly

*Ideal Industries, Inc., Sycamore, Ill.*

A 450-watt, light-duty Thermo-Grip soldering tool operates on the resistance-heating principle.

Touching the work with the soldering tool completes the secondary power circuit and heats the part almost instantly. A thumb switch permits close heat control. Current is on only when the tool is in contact with the part to be soldered.

A complete set of soldering tools or attachments for handling various types of work is available.

# "FLEETWELDERS" ELIMINATE ARC BLOW ...increase welding speed 10%

By J. K. GANNETT
Vice President in charge of Engineering and Research,
The Austin Company,
Cleveland, Ohio

*J. K. Gannett*

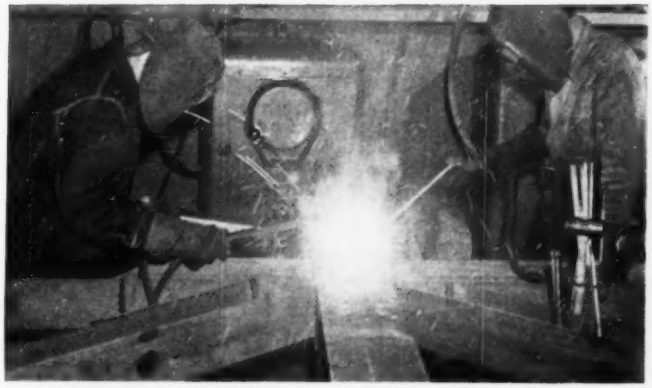


Fig. 1. *Arc welding diagonals to chord with the 500-amp. Lincoln "Fleetwelder" AC welders at the structural fabrication shop of The Austin Company.*

The solid, uniform welds required in our heavy structural work are now being made easier and at lower cost with AC arc welding. By eliminating the restrictions of arc blow in the construction of heavy structural weldments like the roof truss shown, our fabricating shop is today able to take full advantage of higher welding currents with resulting substantial increases in welding speeds.

Structural members like the jack truss shown in the photographs are shop fabricated from wide flange beams and from plate. Component members are first positioned accurately for close fit-up and tack welded. One side is then partially welded with fillets of ¼" "Fleetweld 7" electrode using 500-amp. Lincoln "Fleetwelder" AC arc welders.

After the initial side welds are made, the truss is placed in an upright position as shown in Fig. 2 and continuous welds completed around each member, framing into the lower chord. The truss is then flopped over and similar welding is done for the members framing into the other chord. This procedure permits us to use fast downhand welding techniques on all connections and assures us solid, high quality welds on all joints at the lowest fabricating cost.

Using the AC "Fleetwelders," thus eliminating arc blow, allows our operators to increase their current to over 300 amperes with no difficulty in maintaining a steady, constant arc at all times. Increased amperage, combined with steady, uninterrupted operation, has cut our welding time about 10%.

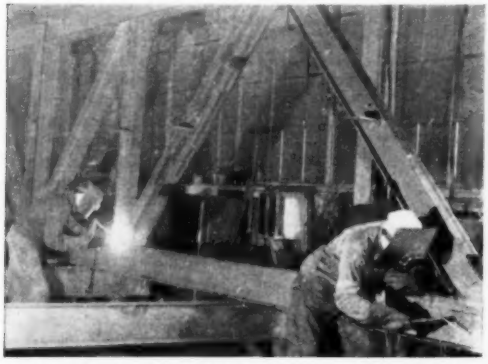


Fig. 2. *Fabricating all-welded 40-ft. jack truss for factory building framework. Top and bottom chords are 10"-21WF beams; diagonals are 8"-17WF beams. Welds are downhand, single pass, ⅜" fillets.*

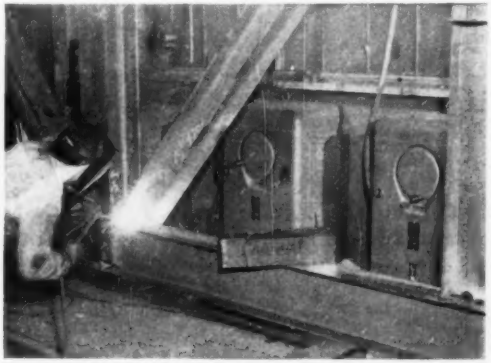
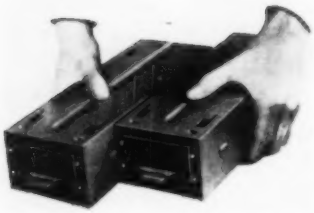


Fig. 3. *Finishing all-around welding of diagonal to bottom chord. Weld is made with single pass ¼" diameter "Fleetweld 7" electrode. Welding current is 310 amps.*

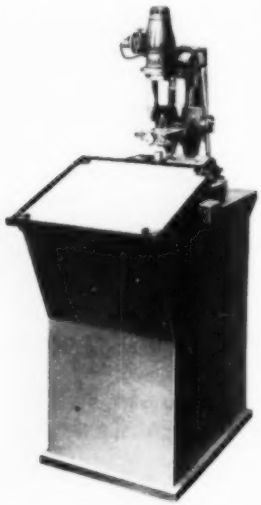
*The above is published by* **THE LINCOLN ELECTRIC COMPANY** *in the interests of progress.*
*For further information on "Fleetwelders," write for Bul. 366. The Lincoln Electric Company, Dept. 104, Cleveland 1, Ohio.*



## Steel Interlocking Drawer Units Offered for Parts Storage

*The Cincinnati Ventilating Co., Inc., Covington, Ky.*

Interlocking drawer units of all-steel construction are designed for parts storage. Drawers are 11 11/16 in. front to back, 3 15/16 in. wide and 3 in. deep. Units are designed to interlock with others at top, bottom and sides, to form a rigid cabinet. The new large Multi Drawer accommodates five dividers.



## Checking at Varied Magnifications Done with Profile Projector

*Hauser Machine Tool Corp., Manhasset, N. Y. (Representative of Henri Hauser, Ltd., Bienne, Switzerland)*

Profile projector is used for checking and measuring at different magnifications and illuminations. Interchanging of parts for magnification or illumination purposes is eliminated. All optical parts are built in. By twisting the turret lenses the desired magnification snaps into position. The magnification slide also snaps automatically into place in alignment with the turret lenses. Luminosity and perfect sharpness of the image can be had in all parts of the screen.

Surface areas show clearly under episcopic illumination on 50 and 100 magnifications. Gear wheels, hobs, cutters, taps and other parts can be measured easily and quickly. Reading accuracy on the screen is approximately 0.004 to 0.008 in. which at a magnification of 100X corresponds to an error on the object of 0.00004 to 0.00008 in.

## Veeder-Root Magnetic Counter Speeds to 1000 Counts per Min.

*Veeder-Root, Inc., Hartford 2, Conn.*

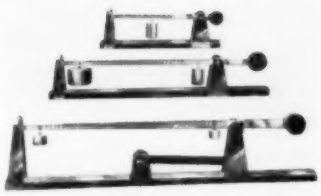
The Model 1248 magnetic reset counter features the "Easy-Eye" direct-reading line of six large figures in windows brought out by the contrasting background of a band of light gray. Over-all dimensions are 3 15/16x2$^{1}/_{2}$ in. x 1$^{5}/_{8}$ in. The reset magnetic counter operates on dc. only.

The counter speed of 1000 counts per min. is maximum recommended. An 80-amp.-hr. storage battery with time of contact on commutator or circuit breaker adjusted to minimum required should run this counter to 5,000,000 counts on one charge.

## Airco Line of Hardfacing Alloys Is Divided into Three Groups

*Air Reduction Sales Co., 60 E. 42nd St., New York 17, N.Y.*

A line of hardfacing alloys is divided into three primary groups: ferrous alloys, cobalt-base alloys, and tungsten carbide. A total of 15 are available. The hardfacing alloys have been developed to combat abrasion, impact, heat and corrosion.

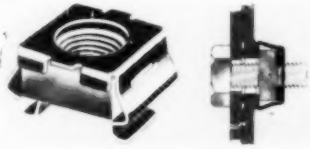


## Airdraulics Trutorq Beam Stands Give Wide Range of Measurement

*Airdraulics Engineering, Inc., New Canaan, Conn.*

Two models of the Airdraulics Trutorq beam stands, Model SDB-10 and SDB-50 provide a range of torque measurement from 0 to 50 in.-oz. up to 50 ft.-lb. They are used for testing power tools for setting and regulating the torque of hand, pneumatic and electric power tools in production use and for checking the tightness of fastenings and setting up torque standards.

The Model SDB-10 has a range of from 0 to 50 in.-oz. calibrated in increments of $^{1}/_{2}$ in.-oz.; Model SDB-50 covers from 0 to 50 ft.-lb. in increments of $^{1}/_{4}$ or $^{1}/_{2}$ ft.-lb. All models are made with ball-bearing beam fulcrum.



## One-Piece Speed Grip Nut Retainer Will Snap Into Location by Hand

*Tinnerman Products, Inc., 2038 Fulton Road, Cleveland 13, Ohio*

The Speed Grip nut retainer is introduced for operations requiring the fastening of square nuts to sheet-metal panels. The nut retainer is said to cause assembly savings by eliminating welding, punching or staking.

Retainers are snapped into place by hand, or with a screwdriver, and their spring-steel mechanical hands hold the nut in bolt-receiving position. When the speed grip is attached to a sheet-metal panel, one prong is inserted into the square hole and the other snapped into place by applying pressure by hand or with a screwdriver. No wrench is needed to hold the nut in place while the bolt is being tightened.

# Uniform Predetermined Steps on

## LELAND - GIFFORD

## *Step Feed Hydraulic Adapter Units*

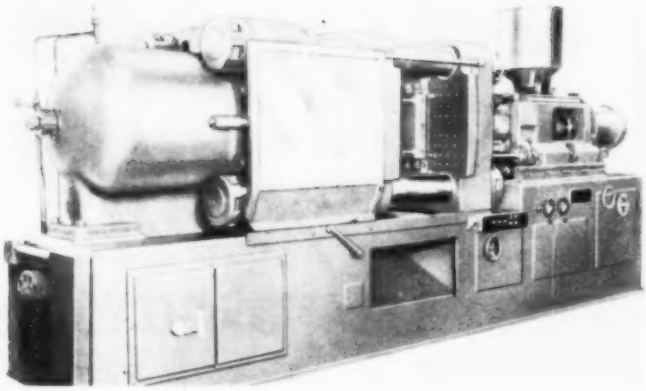
remove chips from the hole and let coolant down to the drill point at regular intervals. These Features greatly reduce the run out in drilling deep holes and allow more holes to be drilled between sharpenings.

The overload pressure release also helps to prevent drill breakage by keeping the pressure on the drill within safe limits at all times.

**Bulletin No. 850A explains fully**

**LELAND-GIFFORD**

**WORCESTER 1, MASSACHUSETTS, U. S. A.**



## 48-oz. Injection Molding Machine Has Automatic Stuffing Arrangement

*Watson-Stillman Co., Roselle, N. J.*

A 48-oz. machine is a single-shot automatic injection molding machine said to materially increase the size range of products which can be injection molded in one piece from thermoplastics. The 48-oz. machine is provided with an automatic stuffing arrangement which increases its rated capacity by 40-50%.

The W-S 48-oz. injection molder is arranged for individual motor drive and powered by radial-piston-type oil-pumping equipment. It is equipped with the W-S heating cylinder especially designed to deliver near-capacity shots of such derating materials as polystyrene without stuffing.

The electrically controlled material feed is self-compensating; cylinder and plunger are service-plated with chromium. The machine weighs approximately 85,000 lb. and requires 300 gal. of oil for operation of its hydraulic system.

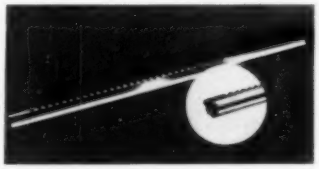
The hopper receives an entire barrel of plastic which is processed at a rate of 200 lb. per hr. Capacity of the hopper is 200 lb., maximum feed is 165 cu.in., maximum ounces per shot, 48, die closing speed (forward) is 420 ipm.; die closing (return) 385 ipm., injection pressure is 21,000 psi., clamping capacity, 1000 tons, stroke of clamping ram, 32 in. Daylight opening is 54 in.; maximum die sizes, 30x50 in.

## Quik-Shot Soldering Iron Needs No Electricity, Flame, Heat

*Kemode Manufacturing Co., Inc., 161 W. 18th St., New York 11, N. Y.*

The Quik-Shot soldering iron needs no electricity, flame or external heat of any kind. It utilizes a chemical cartridge that heats the iron to working temperature in 5 sec. and maintains the iron at an average soldering temperature of 800 F. for seven minutes. The cartridge, about the size of a small flashlight battery, is ignited by the impact of a spring rod which is pulled out and released at the back of the handle.

The chemical mixture used in the cartridge consists of certain magnesium-type powders capable of generating intense heat. No gas is generated, consequently the cartridge is non-explosive. The heat developed is equivalent to about 250 watts, peak. Six interchangeable tip sizes are available ranging from $\frac{3}{8}$ to $1\frac{1}{8}$ in. The iron retails for $5.95, including a package of four cartridges.



## du Mont Keyway Push Broach Eliminates Need of Guide

*The du Mont Corp., Greenfield, Mass.*

An improved "Minute Man" production - type keyway push broach can be used with either a hydraulic or hand-operated arbor press for multiple production of keyways in moderate quantities. The broach supports itself in the hole so that no guide is necessary.

Only one pass is required to complete the standard depth of cut. Each broach is ground to fit its specified hole diameter. The "Minute Man" push broach is available in keyway widths from 1/32 to ¼ in. and for any desired hole diameter.

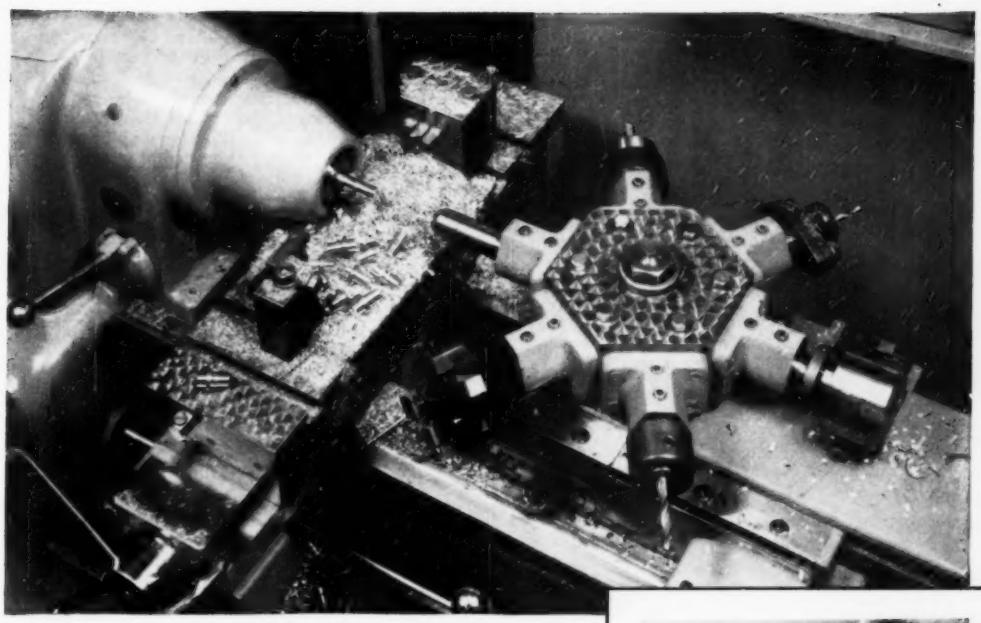
## Dow Mechanical Taper Comparator Will Check to 800 Holes per Hr.

*Dow Mechanical Corporation, Thompsonville, Conn.*

The Tacomp is a taper comparator that will check 800 taper holes per hr. to an accuracy of one minute. The Tacomp uses two contact lines on the taper. Their distance apart as compared to a master is determined on an indicator mounted in the handle of the unit.

The Tacomp records the difference in length of the side adjacent to the angle, whereas the normal sine-bar check is a comparison of the side opposite or shorter side. Gage sets are mounted into the unit by merely inserting, adjusting zero on the indicator while entered into a master and tightening the lock screws.

Gage sets can be changed in a matter of seconds. The Tacomp is not limited to round or cylindrical tapers as gage sets can be designed for wedge tapers, taper splines, dovetail angles and taper slots.



# THE MONARCH SPEEDI-MATIC . . .

## *pays for itself in 2 years*

### on jobs like this

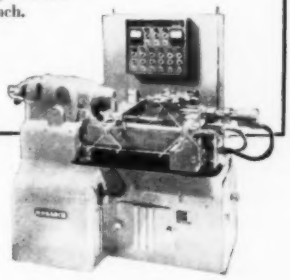
That's the record of the *"World's Fastest Hand Screw Machine"*.

One customer, in fact, has already saved over half the price of his two Speedi-Matics in just nine months of operation—an annual return of 66⅔% on his investment.

Saving possibilities of the Speedi-Matic are completely realized on jobs such as the one illustrated. Extra close tolerances are held, consistently. The variety of cuts takes full advantage of the automatic electronic speed and feed change. With a spindle speed range of up to 5000 rpm maximum, very small work, the softer metals and carbide cutting tools are accommodated at top efficiency.

For *"peak production at a profit"* on jobs up to ⅞" bar stock size—and in lots as small as 25 or up to 500 and more—you can't beat the Speedi-Matic. Ask us for documented case-history proofs of this statement, illustrated in bulletin 1902.

**JOB FACTS:** Brass adapter plug completely machined in one setup, on the Monarch Speedi-Matic, using all six turret faces, front and rear cross slides, and eight control panel stations. Spindle speeds employed include a low of 800 rpm and a high of 3800 rpm. Total time, including handling—.4332 minutes each.

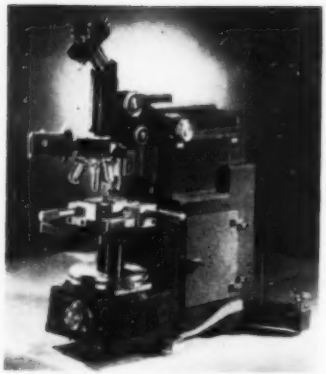


ACCURACY · ECONOMY · LONG LIFE

Monarch TURNING MACHINES

**THE MONARCH MACHINE TOOL CO., Sidney, Ohio**

**FOR A GOOD TURN *FASTER* —— TURN TO MONARCH**



## Kentron Micro Hardness Tester Can Handle One-Gram Weights

*The Kent Cliff Laboratories, Peekskill, N. Y.*

The Kentron Micro hardness tester applies accurately dead weight loads as light as 1 gram for use with either the Knoop indenter or the Vickers-type indenter. The bench-type instrument is hand-operated to eliminate instrument-operating vibration.

An adjustable oil-dash pot for controlling the speed of load application and time of load retention is adjusted to suit specific testing requirements. A mechanical stage, consisting of three basic parts, the stationary plate, transfer plate and specimen block, provides an easy and convenient means for positively locating and positioning the exact area of the test specimen underneath the indenter and microscope. Dead weights for applying loads of 1 to 1000 grams, and up-to-date optical measuring equipment are supplied.

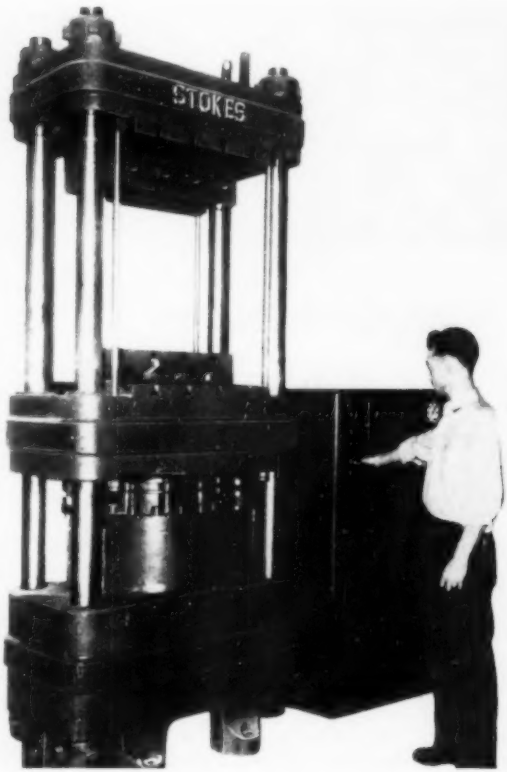
## Adapter Listed as Hamer-Dril Converts Drill to Power Hammer

*Hamer-Dril, Box 158, Planetarium Station, New York 24, N. Y.*

The Hamer-Dril is an adapter which when chucked in any ¼-in. electric drill converts it into a compact, portable power hammer suitable for any purpose where rapid, moderately heavy hammering is required. The Hamer-Dril can also be operated in a drillpress or by a flexible shaft and strikes blow per revolution of the driver.

The force with which it strikes is built-in and is the same whatever the speed or power of the electric drill or other driver. The tool socket is a 9/16-in. hex opening which makes adapting tools for special purposes very simple. By means of the flats of this hex, rotary motion under power is conveyed to the drillbits while hammer blows are being delivered.

This combination of percussion and rotation is desirable in drilling in tile or brick, etc., both to get a round dimensioned hole and to prevent the drillbit from freezing in the hole. Rotation may be omitted when not needed as when chiseling. Because of the wide use of Rawlplugs two toolholders to fit the taper shanks of Rawldrills are furnished as standard equipment with the Hamer-Dril. These toolholders fit 10 sizes of drillbits from No. 6 wood-screw size to ⅝ in. Hamer-Dril is priced at $22.50.




## 200-Ton Plastics Molding Machine Offers Semi-Automatic Operation

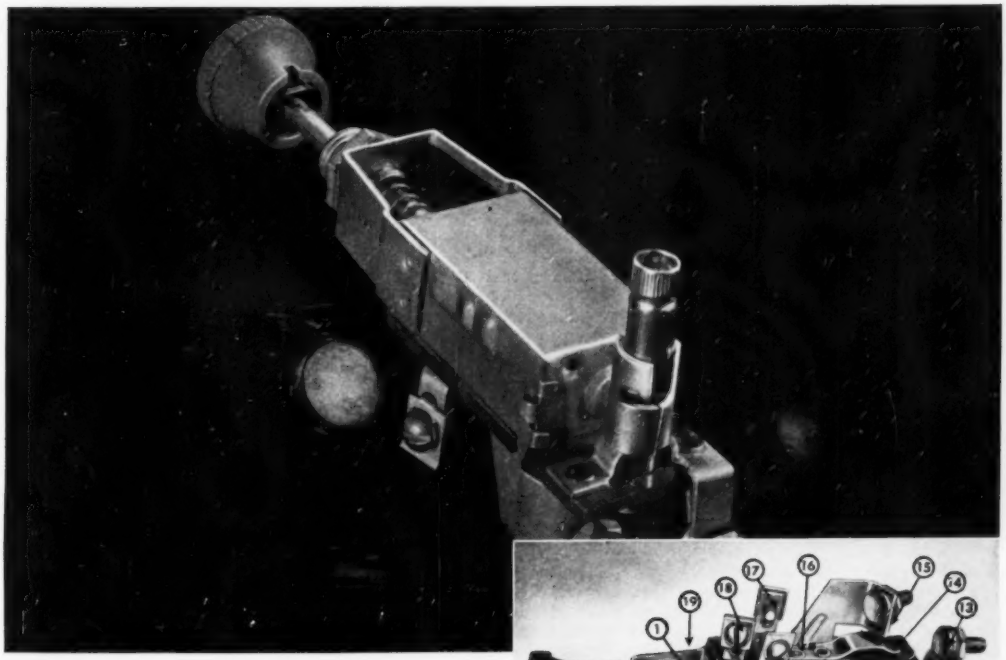
*F. J. Stokes Machine Co., 5900 Tabor Road, Philadelphia 20, Pa.*

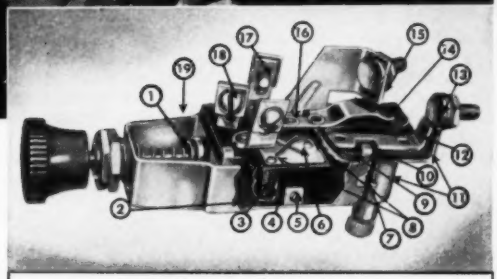
A semi-automatic plastics molding machine has a 200-ton straight-ram type hydraulic press. Model 723 is suited for general-purpose molding. The press meets the demand for molding large parts having deep draws and heavy sections, such as radio cabinets, and telephone bases.

Some of the features include an automatic cycle controlled by Stokes bar-type controller; three-speed controlled closing; low hydraulic pressure system; adaptable return stroke; easy-to-operate electrical and hydraulic controls, and conversion to plunger molding.

# REVERE MATERIALS + COLE-HERSEE DESIGN ASSURE DEPENDABLE HEADLAMP OPERATION

**(Sixty Percent of All Automobile Accidents Occur After Dark)**






**Three-Position Heavy Duty Headlamp Switch, made by Cole-Hersee Company, 20 Old Colony Ave., Boston 27, Mass.**

1. Spring Backed Dustproofed Gland
2. Heavy Steel Case and Bracket
3. Four Separate Contact Springs
4. Moulded Bakelite Contact Carrier
5. Double Independent Action
*6. Heavy Gauge Phosphor Bronze Contactor
7. Interlocking Back Prevents Short Circuiting
*8. Silver Inlaid Phosphor Bronze Contacts
9. Canvas Base Bakelite
10. Six Clinching Ears
11. One Piece "Hot Wire" Conductor
12. Heavy Reinforcement and Thrust Stop
*13. Terminal Studs Welded to Conductors
*14. Heavy Gauge Phosphor Bronze Spring Contacts
15. Heavy Conductor and Thrust Stop
*16. Silver Inlaid Phosphor Bronze Contact Rivets
17. Heavy Gauge Screw Terminals
18. Shakeproof Lockwashers With Locking Tail
19. Bracket Extension To Clear Dash Obstructions

*Parts starred are made of Revere Metals

HERE is a picture and sectional view of a device frequently used by motorists, who know nothing about it except that it has a knob and works perfectly when pushed or pulled. It is a Cole-Hersee three-position light switch: Off, Parking Lights, Headlights.

Because such a switch is so reliable and long-lived, one might suppose it to be simple. It is far from that. Its operation, however, is simple, and is protected by design and materials which foresee the conditions and contingencies of use.

Note the variety of the materials. They include steel in several types and forms, brass, phosphor bronze, canvas base bakelite, a felt washer to exclude dust, plastic, and if you include the fuse, lead and glass. In the list of features the four items starred are made of Revere Metals.

This is an excellent example of the manner in which wise manufacturers employ Revere Metals. Both they and we realize that every metal and material has its individual qualities and applications. When these are understood and chosen with full regard for conditions of fabrication and use, a fine product has been given its fundamental guarantee. It is one of the important duties of Revere Technical Advisors to collaborate in the selection of the many different Revere Metals. If you would like to obtain the benefits of this service, get in touch with the nearest Revere Office.

**REVERE**

**COPPER AND BRASS INCORPORATED**

*Founded by Paul Revere in 1801*

230 Park Avenue, New York 17, New York

• • •

*Mills: Baltimore, Md.; Chicago, Ill.; Detroit, Mich.; New Bedford, Mass.; Rome, N. Y.—Sales Offices in Principal Cities, Distributors Everywhere.*

## Five Dial Bore Gages by Nilco Cover Range from 7/8 to 12 in.

*Nilsson Gage Co., Inc., 2A Lake St., Poughkeepsie, N. Y.*

The large Nilco dial bore gages are offered in five sizes ranging from 7/8 to 12 in. and are standard with a tenth indicator. They can be adapted with any other type of indicator of any graduation, make or model of the American gage design standard class.

The range extension consists of three parts, the extension, washers and nut. The approximate adjustment of the gage to specific dimensions is obtained by selecting the correct range extension and washers. When the proper extensions and washers are selected, the bore gage is then set in a master ring or gage blocks.

The final setting for the zero reading in the first quarter of the dial is made by simple adjustment of the indicator. Three-point alignment and two-point gaging principles are used in this gage.

**5-TON ROUSELLE DEEP-THROAT PRESS, No. OG, has been added to the regular line of deep-throat, open-back inclinable- and adjustable-bed horn presses. Press is available in both bench and floor models. The 12-in. throat permits working to the center of 24-in. sheets. The press has a heavy-duty clutch which can be set for single-stroke or continuous opera-**

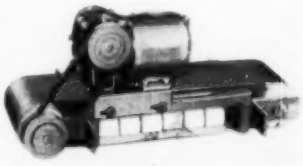
***Service Machine Co., 7627-33 South Ashland Ave., Chicago 20, Ill.***

## Spring-Actuated Type Collet Chuck By Erickson Works Automatically

*Erickson Tools Division, 2311 Hamilton Ave., Cleveland 14, Ohio*

An automatic spring-actuated collet chuck offers a cam-released set-up which greatly speeds up polishing, grinding, and other machining operations. Operator merely feeds and unloads the machine. Eight chucks are mounted on a multiple-spindle head.

Chucking and release of parts is automatic. A cam releases spring tension on each chuck as it comes into unload and feed positions. Cam then releases actuating spring which collapses the collet onto the piece.



## Automatic Self-Cleaning Principle Applied to Alnico Plate Magnet

*Dings Magnetic Separator Co., 4740 W. McGeogh Ave., Milwaukee, Wis.*

Automatic separation of magnetic and non-magnetic materials with an Alnico plate magnet has been achieved with the Self-Cleaning Perma Plate.

This permanent non-electric magnet unit is designed to provide moderately priced automatic protection for crushers, grinders, pulverizers, stokers and other machinery susceptible to tramp iron damage. It removes contaminating iron from such materials as food, grain, liquids and sand. It can be installed over conveyor belts, spouts, or chutes.

**TWO-WAY 42-SPINDLE HORIZONTAL MACHINE has a shuttle fixture to rough and finish bore large hole, face ends, drill and ream bolt holes from outside, and spotface bolt holes from inside on an axle. Machine consists of a fabricated-steel center base with two side bases each of which supports 2 5000-lb. twin-ram units. Center base carries 3-station shuttle-type fixture and special rear-drilling unit used in spotfacing holes from inside of axle ends. Production is approximately ten axles per hr.** ***—LeMaire Tool & Manufacturing Co., 2657 South Telegraph Road, Dearborn, Mich.***

# THAT "Something Extra" YOU GET IN CONTINENTAL CUTTING TOOLS

CONTINENTAL'S engineering knowledge is an important extra you get in Continental cutting tools. Continental's 30 years' experience as designer and manufacturer of a wide range of cutting tools is your assurance of correct design, exactness of manufacture, and greater accuracy and production in operation. Continental products include counterbores, face milling cutters, broaches, and special carbide-tipped tools. Continental can help you raise your production and reduce your unit costs. Call your local representative, or write Ex-Cell-O in Detroit today!

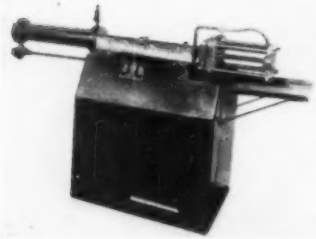
(left) Core drill with interchangeable tip
Roughing and finishing slotting cutters
Carbide-tipped multi-diameter counterbore
Special form-relieved milling cutter (above)
Continental Broach
Counterbore cutter with Continental drive (above)
Ground flat form tool
Inverted spot face cutter and driver
Shell reamer
Inserted blade face milling cutter
43-6

CTW

**CONTINENTAL TOOL WORKS**

*DIVISION OF EX-CELL-O CORPORATION*

DETROIT 32, MICHIGAN

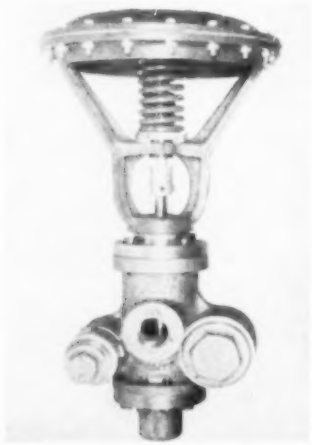


## Zagar Broaching Attachment Push Broaches Two Holes at Once

*Zagar Tool, Inc., 23880 Lakeland Blvd., Cleveland 23, Ohio*

A broaching attachment is offered for the Zagar standard 20-in. pull broaching machine for push broaching two holes at one time, maintaining both relationships and hole center spacing. The two broaches are fastened permanently into the ram of the fixture which is in turn pushed by the ram rod of the broaching machine.

The part is located onto the head end of the broaching fixture and the operation consists of pushing the broaches through and pulling them back out. The return stroke serves to release the part, which in turn drops down into the tray.



## Diaphragm-Actuated Two-Pressure Valves Range from 1 to 4 in.

*Emmett Machine & Mfg. Inc., 2249-1 Fourteenth St., S. W., Akron 14, Ohio*

A line of diaphragm-actuated two-pressure Merit valves is available for a wide range of application in high-pressure hydraulic service. The valves range in size from 1 to 4 in. and can be furnished for operation on systems having 3000-, 5000-, and 10,000-psi. pressure.

Variations of valve assembly provide for diaphragm-controlled high-pressure inlet, diaphragm-controlled slow-travel valve, and diaphragm-controlled stop valve, all handled within one casting and with minimum pipe connnections. Merit valves offer interchangeability of seats and disks between main-valve and check-valve assembly.

## Heavy-Duty Soldering Iron Powered at 700 Watts

*Hexacon Electric Co., 135 W. Clay Ave., Roselle Park, N. J.*

A heavy-duty soldering iron powered at 700 watts has a replaceable $1\frac{3}{4}$-in. dia. screw-type tip. It operates on any cycle, ac. or dc., and is furnished for either 110 or 220 volts. The iron is designated as Model 700.

The heating element is housed in a damage-proof hexagon-shaped housing which protects it from danger of mechanical injury. Cooling fins deflect the heat away from the handle. The high-heat alloy element core resists scale and prolongs the life of the element. The soldering iron lists at $27.00.

## Cunningham Hand Tool Holder Constructed of Cast Aluminum

*M. E. Cunningham Co., 95 E. Carson St., Pittsburgh, Pa.*

The M. E. Cunningham redesigned "Safety" hand toolholder is constructed of light-weight cast aluminum. The wall thickness at the corners of the holder head is $\frac{1}{4}$ in. where it was formerly 3/32 in. Holders are available in two models—Model HTF-1 with finger lever-type control for fast opening of holder when stamps or tools are inserted or released, and Model HTS-2 with knurled adjustable screw-type control for adjusting the lever spring to accommodate various size tools.

Holders are available in the following range of sizes designated as Size No. 1 to hold $\frac{1}{4}$-in. to $\frac{1}{2}$-in. width or diameter tools; Size No. 2 for $\frac{1}{4}$-in. to $\frac{3}{4}$-in. width or diameter tools; Size No. 3 for $\frac{1}{2}$-in. to 1-in. range; Size No. 4 for $\frac{3}{4}$-in. to $1\frac{1}{4}$-in. range. Weight of Sizes Nos. 1-2-3 range from $\frac{3}{4}$ to 1 lb. All holders can be used with square, octagon or round tools.

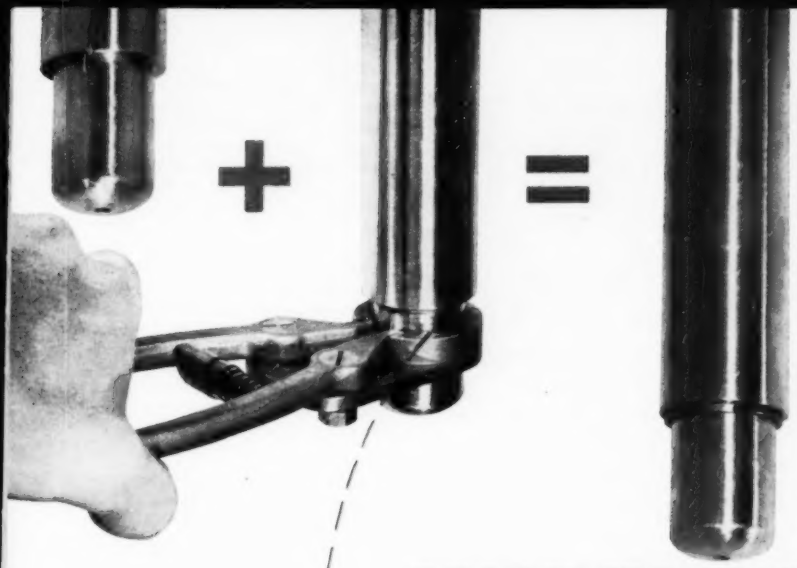
## Hot-Vapor Stainless Degreasers Feature Automatic Control

*Circo Products Co., 12117 Berea Road, Cleveland 11, Ohio*

A hot-vapor stainless-steel degreaser incorporates automatic control. This equipment will clean and dry any metal before and after intermediate processing, especially in industries where plating, painting or buffing is done.

The solvent is heated, creating clean, hot solvent vapor which penetrates greases and oils to the bare metal parts being degreased where it condenses on the colder metal, continuing to wash away the soil until the parts have been completely degreased.

No attention is necessary during the operation. The smallest Circo degreaser is the electrically operated, automatically controlled Cub, which requires approximately 18x 23 in. of floor space and stands about $42\frac{1}{2}$ in. high. Circo-Solv solvent used in the Cub will degrease all metals and will not burn or explode, thereby reducing fire hazards. Circo-Solv vaporizes at a lower temperature.



# READY-MADE SHOULDERS

## to cut your production costs

No longer is it necessary to tediously machine away pounds of metal to produce strong shoulders on shafts or in counterbores.

With ready-made shoulders—Reliance Snap Rings—you merely machine a groove at the proper place on the shaft or in the bore and snap the ring in place.

The powerful spring tension, developed in the cold drawn steel from which they are formed, plus controlled heat treating, keeps them in place, even under heavy thrust loads.

See for yourself how much Reliance Snap Rings can cut your costs. Send samples or prints of your shouldered parts for study and recommendations by Reliance engineers.

Reliance Spring Lock Washers automatically keep bolts, nuts, screws tight under constant tension—compensate for wear and developed looseness. All sizes—many types. Write for Spring Lock Washer folder.

Eaton Springtites—Powerful Reliance Spring Lock Washers of proper size and type, permanently pre-assembled on bolts or screws—speed assembles . . . cut costs. Write for Eaton Springtite folder.

# RELIANCE SNAP RINGS

**EATON**

**EATON MANUFACTURING COMPANY**

**RELIANCE DIVISION, MASSILLON, OHIO**

*Sales Offices:* New York, Cleveland, Detroit, Chicago, St. Louis, San Francisco, Montreal

## Pocket-Size Sound-Level Meter Determines Noise Loudness

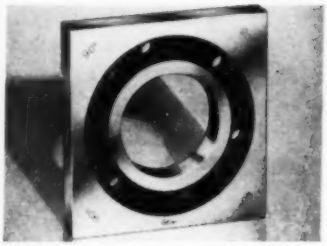
*Hermon Hosmer Scott, Inc., 385 Putnam Ave., Cambridge 39, Mass.*

Pocket-size sound-level meter is offered as an accurate measurement of noise levels. The flashlight size Type 410-A sound-level meter has many applications in production testing of machinery, establishing and maintaining design specifications, and other uses. The level meter covers the range from 34 to 140 db above the standard ASA reference level, including all three standard ASA weighting characteristics, to duplicate the response of the ear at various levels and has a two-speed meter, provision for using extension cable, optional types of microphones, vibration pickups, and analyzers and filter. Unit is $11\frac{1}{2}$ in. long, has a $2\frac{1}{2}$-in. dia. and weighs slightly over 2 lb. including batteries.

## Water-Cooled Electrode Holder Offered for Resistance Welding

*P. R. Mallory & Co., Inc., 3029 E. Washington St., Indianapolis 6, Ind.*

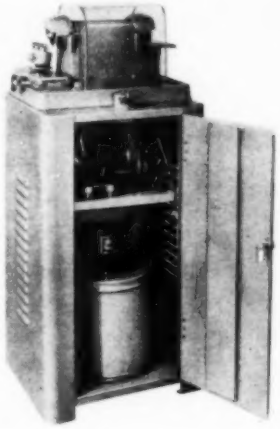
A leak-proof, water-cooled welding electrode holder is said to eliminate the problem of drops of water which cause rust or discoloration of the material being processed. Standard size O-rings are used in place of ordinary packing. In the KO holders copper alloy as well as brass or stainless-steel assembly including all internal parts is used.



## Webber True Square Offered For Precision Indexing

*Webber Gage Co., 12900 Triskett Road, Cleveland 11, Ohio*

The Webber True Square is designed for precision indexing. All faces are at precisely 90° to adjacent sides with perfect optical flatness and parallelism. Accurate to millionth parts of a circle, it may be combined with Webber angle gage blocks to index any desired combination of angles.



## Carbide Tool Grinder Handles Tools to 1-in. Shank

*United States Diamond Wheel Co., 701 Illinois Ave., Aurora, Ill.*

A carbide grinder features small-diameter wheels and accommodates tools having up to 1-in. shanks. The grinder is equipped for wet grinding and has a grinding spindle engineered to run smoothly at 9000 rpm. which gives a higher surface speed to smaller, less expensive wheels, making them cut faster and perform more efficiently.

The spindle is mounted in a removable cartridge-type ball-bearing unit. The diamond wheel has a full $\frac{3}{4}$-in. wide grinding-wheel surface for off-hand grinding and is placed at a convenient operator height to obviate fatigue. The grinder is equipped with cabinet, 1/3-hp. motor, coolant pump, wheel guards and two diamond wheels.

Height to spindle is 46 in. Floor area is 24x24 in. Shipping weight is approximately 275 lb. The grinder is suitable for grinding of clearance angles and chip breakers on single-point tools and inserted blades for milling cutters. It is obtainable in single-end, double-end, or off-hand and chip-breaker models. The model illustrated is priced at $385, including two diamond wheels.

## Multilift Rotary Magnetool Picks Up Steel Scrap or Parts

*Multifinish Manufacturing Co., 2114 Monroe, Dept. No. 304A, Detroit 7, Mich.*

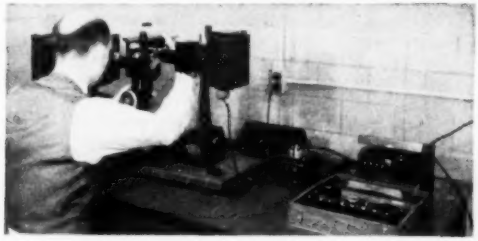
The improved Multilift rotary Magnetool is used for steel pick-up purposes, giving 50% more magnet power. The rotating magnetic tube is propelled manually in carpet-sweeper fashion to pick up steel scrap or parts from floors, parking lots and driveways. It can be used to remove tramp iron from liquids, powders and the like and separates steel from other materials.

The tools are waterproof and oilproof and operate without wires or electricity. An acid-proof model adaptable for use in tanks is also manufactured.

The magnetic tube rotates with the wheels and leads automatically to a thickness of $\frac{3}{4}$ in. on the entire 360° surface. Standard sizes ranging from 9- to 24-in. over-all width are available for any job requirement at $18.25 to $36.00 fob. Detroit. Unloading is accomplished by pushing the wiper ring from one end of the tube to the other where a non-magnetic area causes instant release of the load.

# What makes a broach GOOD?

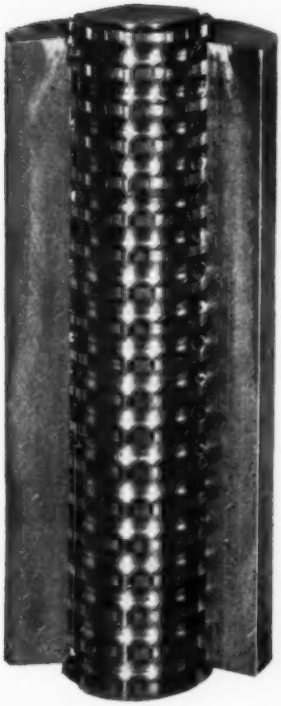
At right, index and spacing checker for spline or serration broaches. Also checks lead. In front, special surface plate to check alignment. Note comparator in background for checking complex contours on broached samples.



Metallographic analysis of heat-treated specimens (taken at different radii on large broaches), precedes fabrication.

A complete chemical and physical lab provides facilities for metal analysis. Operated by trained technicians.

Test pieces produced during the grinding of involute splines on broaches are checked on this Michigan Tool involute checker.



Typical of Colonial's continuous research on chip characteristics and the effect of various factors such as material, pitch, breaker spacing, etc., is this study on "deep hole" spline broaching.

A **GOOD** broach is about the most inexpensive tool you can buy—based on the number of finished pieces which it will produce. On the same basis, a poor or mediocre broach can be a costly investment, no matter what you pay for it.

Colonial's ability to consistently design and produce **GOOD** broaches is no accident. It is a matter of constant vigilance—checking and re-checking at every stage—plus the finest of inspection "tools". Here are some of the facilities that make Colonial broaches **GOOD** broaches.

***For the name of Colonial's representative in your area, write (Box 37, Harper Sta.), wire, or phone (LA. 7-1600) today.***

PIONEERS OF H.S.S. BROACHING

COLONIAL

BROACH CO. DETROIT 13

*Colonial Makes* **GOOD** *Broaches*

# Dear Boss:

BY ERIC TORR

**Gems of humor—and illiterature—lie buried in every company's letter files. Here, we've exhumed a might-have-been series. A departure from our sedate norm, it provides a ready-reference file of the routines that make all our jobs more interesting**

Bacwudton Hotel
Bacwudton, Ontario
Monday, June 6.

Mr. W. King, Manager
Bigtown Machinery Co., Ltd.
Bigtown, Ontario.

*Re Machinery Installation*

Dear Boss:

My weekly expense account is enclosed.

I reached Bacwudton safely by plane like you told me. Please phone my wife and tell her so. It's not my turn to write her.

They sure pulled the wool over your eyes telling you this was a rush job. I went straight to the mill, and find the manager is off on a two-week fishing trip. And they haven't even ordered the pumps needed for this job, yet. It's darn lucky we didn't ship 3 months ago like you promised them.

I brought up to the company toolbox Joe always uses, by mistake. It didn't do any good, either, because the bottle got broken, and I cut my hand picking out the glass. I'm sure glad they weren't my tools. Alcohol rusts things mighty fast. I'm sending the box back, express. Send me the one I always take. You can tell it, because there are some pin gages in a cloth case. Looks almost like fishing rod. There is also a reel of fish line which I use for lining up. Send it, quick.

Yours truly,
Ben Murphy, Erector.

P.S. Forgot to tell you. The freight didn't stop, and the flat car with our machinery on it was last seen heading for Vancouver. Put the bee on them at your end.

• • •

TELEGRAM

MR. BEN MURPHY, JUNE 8
BIGTOWN MACHINERY CO.
ERECTOR, c/o BACWUDTON
MANUFACTURING CO. BACWUDTON, ONTARIO

RELET DONT EXPRESS TOOLS STOP YOUR QUOTE PIN GAGES UNQUOTE FISH LINE AND SOME EXTRA FISH HOOKS LEFT TODAY

W KING

• • •

TELEGRAM—COLLECT
JUNE 8

MR. W. KING,
BIGTOWN MACHINERY CO.
RETEL TOO LATE.

MURPHY

• • •

Bacwudton Hotel,
June 14.

Dear Boss:

This is one swell town. There is a trout stream right beside this hotel. I can cast from my window. Boy, you should see the one I caught yesterday. Look at the photo (enclosed with my expense account). Isn't it a beaut? The fish, that is. Now, before you bawl me out for wasting my time, remember the lecture you gave me on my last installation job about being diplomatic with the big shots and not offending them. Although honest, Boss, I really did forget that time that the water was due to be turned on at 3.00 p.m. sharp, and it wasn't my fault the supe was looking down the pipe. He was a darn snoop, anyway.

Well, things are different here. The manager and I are just like brothers. I finally caught up with him on his fishing trip; heck, it's not like back home, he was only 100 miles away on the swellest little lake. And it's like you said, Boss, on every job you can always learn something new. Boy, you should see this bozo cast! He showed me a brand new wrist action.

Yours truly,
Ben.

P.S. On reading this over, Boss, I bet you'll think it's a mighty funny

*(Continued on page 156)*

*"The freight didn't stop . . ."*

# ANNOUNCING . . .

# SQUARE D *Electronic* CONTROL

## FOR HIGH-PRODUCTION SPOT WELDING

**NON-SYNCHRONOUS COMBINATION UNIT** . . . one enclosure houses an electronic contactor to make and break power circuit and a timer to govern weld duration and electrode motion.

**SPEED** • Up to 400 welds per minute. No sequencing relays. Simple six tube circuit cancels out operating delays of valve and firing relays.

**ACCURACY** • Regulated DC timing circuits insure accuracy over wide range of line voltage variations.

**CONSISTENCY** • Timing circuit coordinates firing relay operation to give consistent starting point and full cycles of welding current, thus avoiding high transients and transformer saturation.

**LOW MAINTENANCE** • Industrial construction cuts "down"-time, simplifies servicing. Disconnect plugs permit instant exchange of timer panels. Entire timer, including power supply, is removed in one piece without disturbing external connections. Two ¼ turn fasteners release swing-down panel making all components and circuit tie points instantly accessible at screw terminals.

Class 8992, Type ACG-1 for wall mounting

Class 8992, Type ACG-2 for side of machine mounting

*Write* for Bulletin 214, Square D Company, 4041 N. Richards Street, Milwaukee 12, Wisconsin

### The BEST Resistance Welder Control?

• There is no one type. Square D builds both magnetic and electronic controls of many types—each best suited to certain types of applications. Specify Square D, and be sure of getting the best for your job.

HIGH SPEED CONTACTORS

MOTOR DRIVEN TIMERS

Safgrant TIMERS

*Electronic* TIMERS & CONTACTORS

*SYNCRO-BREAK* CONTACTORS

SYNCHRONOUS-PRECISION COMBINATION CONTROLLERS

SQUARE D COMPANY

DETROIT • MILWAUKEE • LOS ANGELES

SQUARE D COMPANY CANADA LTD., TORONTO • SQUARE D de MEXICO, S.A., MEXICO CITY, D.F.

# If Alloys Could Talk . . .

If alloys could talk—could correctly identify themselves, state their hardenability, their mechanical properties and their best working temperatures—the tasks of specifying, buying and heat treating would be greatly simplified and virtually mistake-proof.

Although we stock no talking steels, we put Ryerson alloys through conclusive hardenability tests—literally make every heat in our stocks reveal every essential fact about itself. Then we carefully record the information on a Ryerson Alloy Certificate delivered with the steel.

Because we make our alloys tell all, you're able to specify and buy the safe way—on the basis of hardenability. Because we send a Ryerson Alloy Certificate with every shipment, your heat treaters are provided with the information they need to do a quick, accurate job.

Large stocks of Ryerson certified alloys are in stock for immediate delivery. When you want quick shipment of any alloy requirement call your nearest Ryerson plant.

**PRINCIPAL PRODUCTS**

**BARS**—Carbon & alloy, hot rolled & cold finished

**STAINLESS**—Allegheny metal plates, sheets, bars, etc.

**STRUCTURALS**—Channels, angles, beams, etc.

**PLATES**—Sheared & U. M., Inland 4-Way Floor Plate

**TUBING**—Seamless & welded mechanical & boiler tubes

**SHEETS**—Hot & cold rolled, many types & coatings

**MACHINERY & TOOLS**—For metal working

**Joseph T. Ryerson & Son, Inc. Plants at: New York, Boston, Philadelphia, Detroit, Cincinnati, Cleveland, Pittsburgh, Buffalo, Chicago, Milwaukee, St. Louis, Los Angeles, San Francisco**

# RYERSON STEEL

## *Dear Boss . . .* continued

progress report. But I have to send in my expenses, anway.

P.S. 2 The bottle of rye on the expense sheet is a little gift to the manager. Remember what you said about entertaining, and not to be stingy. Just to make him feel good, I let him win a little bet. I sure wish you could see that guy cast, Boss! He's a wow.

P.S. 3 Tell the shipping clerk if he sends anymore collect boxes I'll fry his liver. I almost had to pay for it myself. The Bacwudton Co. receiver here is a big guy.

P.S. 4 The machinery arrived three days ago.

• • •

Bigtown Machinery Co. Ltd.,
Bigtown, 16 June.

Mr. Ben Murphy,
Bigtown Machinery Co. Erector,
c/o Bacwudton Mfg. Co. Ltd.,
Bacwudton, Ontario

Dear Ben:

Next time you get your girl-friend to take a picture of you holding a fish, make sure her shadow doesn't show all over the foreground. And let's hear how you are getting on with installing the machinery. Or do you fish all day?

Yours sincerely,
W. King,
Manager

• • •

Bacwudton Hotel,
June 20.

Dear Boss:

That was the manager's wife who took the photo, honest it was. Better tear it up, anyway.

Well, I couldn't put up machinery until they got the foundations in, could I? And I couldn't put up machinery when it was half way to Vancouver, could I?

You should worry, anyhow. There you sit, getting $25 a day plus expenses from Bacwudton for me, while I'm ashamed to tell anyone the chicken feed you pay me.

Well, I showed them how to build the foundation, and taught them a thing or two in the machine shop, and helped put up a smoke stack, so I haven't been loafing.

Yours truly,
Ben.

P.S. I think the manager is taking a shine to me. He's always making little hints how he could use a good man. This is a swell town, too, Boss, and they pay well.

• • •

Bigtown Machinery Co. Ltd.,
Bigtown, 22 June.

Dear Ben:

If you are going to quit, we'll let you go as of today and that will

# GULF QUALITY OILS and GREASES

*contribute to smooth operation of world's largest 4-column forging press*

(Above right) 18,000-ton die forging press for light metal aircraft parts. (Above) A maintenance man operates a one-shot lubricator which is filled with one of Gulf's quality greases. (Right) These powerful centrifugal pumps develop hydraulic pressures of 5300 lbs. per sq. in. Gulf Harmony Oil lubricates the pump bearings — insures long, trouble-free life.

The world's largest 4-column forging press and its auxiliary equipment represent a huge investment. To protect this expensive machinery against excessive wear, rust, and sludge, Gulf Quality Lubricants are used—for lubrication of press columns, compressors, pumps, and motors; and in the hydraulic system.

Operating and maintenance men in this plant — as in scores of other metalworking plants — have found that Gulf Oils and Greases are outstanding in quality, uniformity, and performance. And their records show that Gulf Products help them improve production and reduce maintenance costs.

Your plant, too, can benefit through scientific lubrication with Gulf Quality Oils and Greases. Write, wire, or phone your nearest Gulf office today and ask a Gulf Lubrication Engineer to call.

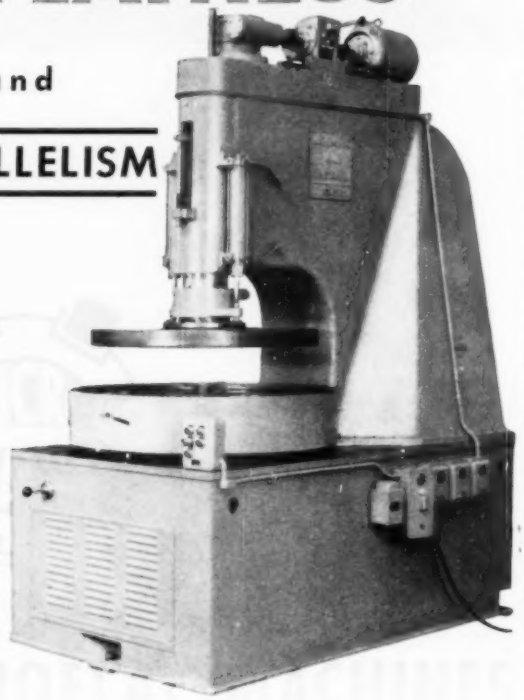
**Gulf Oil Corporation • Gulf Refining Company**

*Division Sales Offices:*

Boston • New York • Philadelphia • Pittsburgh • Atlanta
New Orleans • Houston • Louisville • Toledo

GULF INDUSTRIAL LUBRICATION

# *Productively Generate*
# SURFACE FLATNESS
## and
# PARALLELISM



24 sets—48 parts—of these hardened Gerotor pump gears are finished simultaneously on a Model 844-2 MICROFLAT machine. The surface is optically flat and parallel within 0.0001 inches. Production is approximately 1200 parts per hour.

**Double Surface MICROFLAT machines** provide a high production method of generating parallelism between two opposite faces of a part, in one operation. This is accomplished by mounting a number of parts in fixtures which rotate about their own centers while turning around a pivot gear. Lapping plates, above and below the fixtures, revolve in opposite directions about the common center. This assures that every point on each surface will be abraded by the full area of the plate. Loose abrasive is automatically applied to the plates. The operation of these machines is simple and the results are consistently accurate.

DISTRICT FIELD OFFICES:

1323 S. Santa Fe, Los Angeles 21, California
616 Empire Bldg., 206 S. Main St., Rockford, Ill.
55 George St., Brantford, Ont., Canada
Micromold Manufacturing Div., Boston Post Road, Guilford, Conn.


## *Dear Boss . . .* continued

please your new boss, for he'll get the same work done and not have to pay us $25 per day and expenses. Don't forget the expenses.

Whether you are working for us, or not, get moving on installing that equipment.

Yours sincerely,
W. King,
Manager

• • •

Baewudton Hotel,
June 27,

Dear Boss:

You sure have a swell sense of humor.

We got the foundation all set and the bearings lined up. What a week I had! You know me, Boss, always accurate to a split red hair. And they send out a kid with a surveyor's level to help me! Well, he was a bright-looking kid, all right, so I let him be. Then I began to notice everytime he takes a reading, he writes something in a little book, turns the level over, squints again, and then does some fancy figuring. "Whasamatter, Chum," I says, "Really double checking, aren't you?" Well, he turns a bit red, so I look through the level myself. First, I can see nothing for dirt, then I pick out the target, and she seems right on. So I reverse the level and of course the target should still be right on. But all I can see of it is a little bit at the top. "It's a little out of adjustment Mister," pipes the kid. "But I always take the average, so I'm still right." "Kid," I say "I always wondered why this mill had a mezzanine floor at one end, and now I know. You must have been handling this level, and that's as close as you could come to getting the floors at the same height."

So I spent the morning adjusting the level, and I spent the afternoon lining up piano wire where the center line of the shaft is to be. Well, just as I had the wire perfectly set and was going to lock the batter boards in place, along comes the

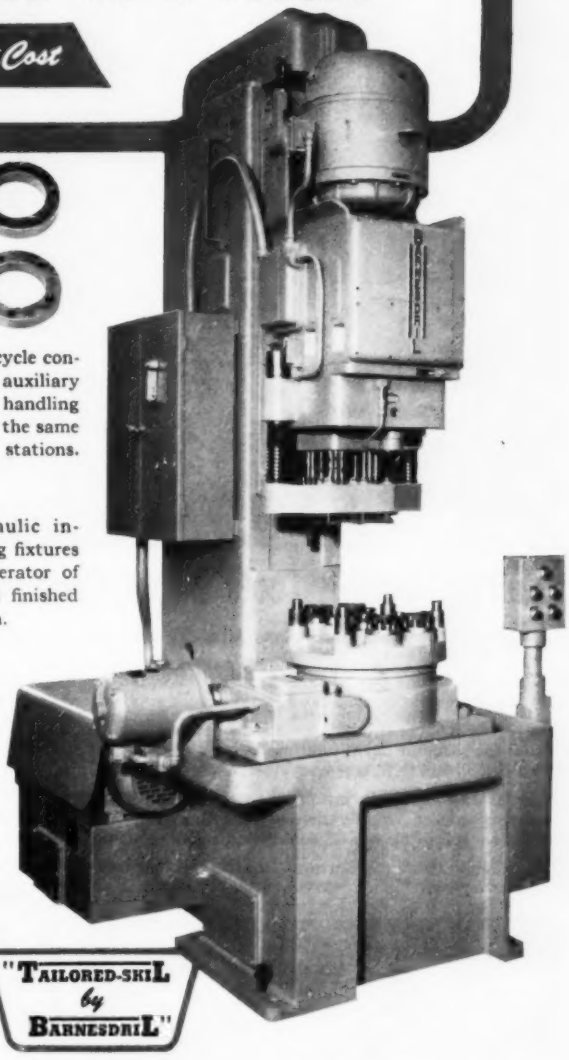
*"I always take the average, so I'm still right . . ."*

BARNESDRIL *Unit Type Machine*

# Drills 26 Holes

## PER LOAD OF 4 PIECES

*Faster, Easier, with Less Cost*



**Faster** Engineered timed-cycle control and 26-spindle auxiliary drilling head have eliminated individual piece handling and idle machine time. All holes are drilled at the same time, while loading is going on at the other stations. Output is 480 pieces per hour.

**Easier** Automatic hydraulic indexing, self-locating fixtures and automatic cycling have relieved the operator of all manual movements except removing the finished pieces, and dropping new blanks into position.

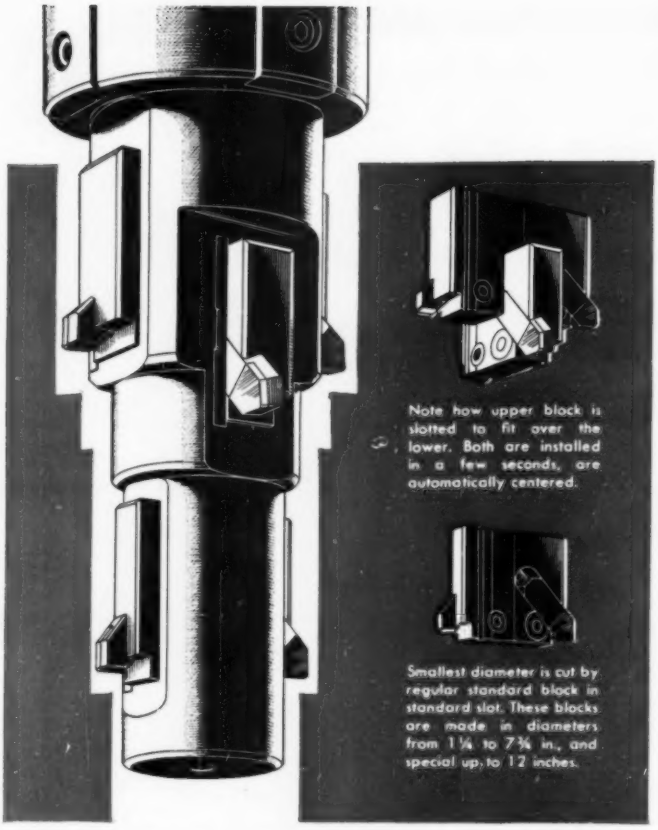
**Less Cost** This combination — timed-cycle control; reduced non-machining time; progressive machining of separate parts and separate operations at the same time — is producing 480 pieces per hour from one machine. Best previous time was 200 pieces of each part per hour from 2 machines.

Send for additional information on BARNESDRIL Unit-type production methods for other work including reaming, tapping, threading, facing, counterboring or milling operations. Ask for Bulletins B1504 and B34.

"TAILORED-SKIL by BARNESDRIL"

**BARNES DRILL CO.**

830 CHESTNUT STREET ROCKFORD, ILLINOIS U.S.A.


Note how upper block is slotted to fit over the lower. Both are installed in a few seconds, are automatically centered.
Smallest diameter is cut by regular standard block in standard slot. These blocks are made in diameters from 1¼ to 7¾ in., and special up to 12 inches.

# Gairing Boring Tools Boost Production

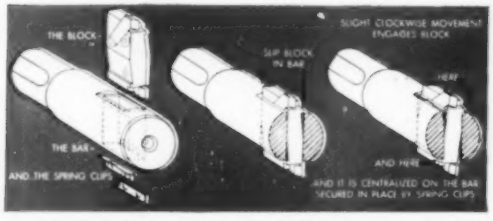
***Quick-Change Blocks Save Man-Hours and Down-Time***

Held in the boring bar without locating holes and screws, only GAIRING STANDARD BORING BLOCKS can be used in such applications as shown above.

The operation consists of boring diameters of 2.693, 2.228, and 1.875 inches in a tractor drive housing, cutting cast iron at a surface speed of 200 F.P.M., 0.020″ feed per revolution.

Here, as always, blocks are pre-set to size, perfectly self-centered; always positively locked, rigidly driven. They are used extensively for rough boring as well as for semi-finishing and reaming operations.

Let us show you how GAIRING BORING BLOCKS may be applied to your problems.


THE BLOCK
SLIP BLOCK IN BAR
SLIGHT CLOCKWISE MOVEMENT ENGAGES BLOCK
THE BAR
AND HERE
AND THE SPRING CLIPS
AND IT IS CENTRALIZED ON THE BAR SECURED IN PLACE BY SPRING CLIPS

Write today for the Gairing Block-Type Boring Tool Catalog

**GAIRING TOOL COMPANY, 21226 Hoover Rd., Detroit 32, Michigan**

## *Dear Boss . . .* continued

darn-fool manager and leans on a batter board. I walked over to tell him politely what I thought, but two of his men kind of got in the way. As they were picking themselves up, he saw what he'd done, but he's a good egg. All he said was, "Come on, Ben, and I'll buy you a drink."

We are all set to put the shaft in tomorrow, Boss.

Yours truly,
Ben.

• • •

Bigtown Machinery Co. Ltd.,
Bigtown, 30 June.

Mr. Ben Murphy, Erector,
Bacwudton Manufacturing Co. Ltd.,
Bacwudton, Ontario.

Dear Ben:

Received an order for spare parts from Bacwudton last Thursday. Wrote back and told them they didn't need all those spares; there were almost enough to make a new machine. But they said they had talked it over with you, and you had claimed every one of those parts had broken on one job or another. They were peeved too, because our claim is that our machines outlast all others. If you ever saw a broken main base, I'd like to know where. Now you straighten this out. The only spares they need are bearings and chains.

Yours sincerely,
V. King,
Manager

• • •

Bacwudton Hotel,
July 5.

Dear Boss:

So I sell a new machine, and that's all the thanks I get! If one of your fancy dude salesmen had done it, you'd pat him on the back, and give him a good, fat commission.

The manager says to me "Now, that part there, Ben. Could it break?" And I say "It might." And that's all there was to it. And so it might too, if it happened to be in a train wreck.

I have sure learned how to humor the big-shots now. You will never hear another complaint from a customer about me. The manager and I are like twins.

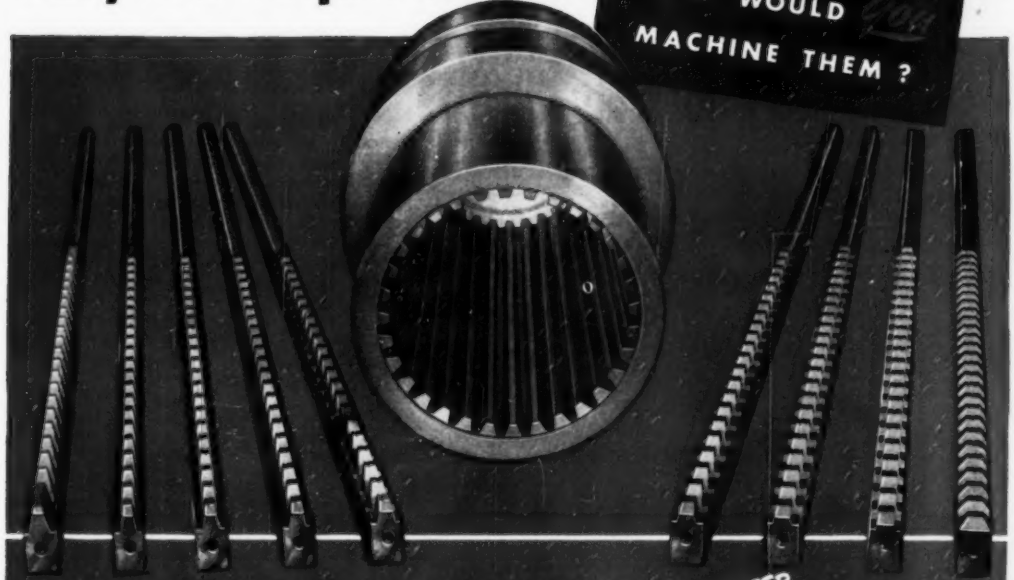
Yours truly,
Ben.

P.S. I enclose all my time-sheets. Sorry they are late, but it's a nuisance making these out on a job. Since you took me off monthly salary and put me on an hourly rate same as if I was still in the shop, I suppose you expect them. You may be surprised to see overtime on the sheets. It was at the special request of the manager, so I got him to sign it to show it was O.K.

*(Continued on page 162)*

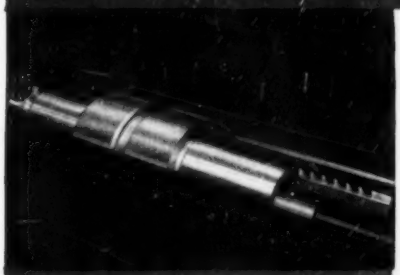
# only 20 required . . .

**HOW WOULD *You* MACHINE THEM ?**



MOST JOBS CAN BE PERFORMED BETTER AND FASTER BY BROACHING

. . . SOME CAN'T BE DONE ANY OTHER WAY!



By using a set of 9 broaches, each properly protected by forced lubrication over the entire length of the cutter bar, it took only 5 to 6 hours to completely broach each piece. Accuracy in spacing was held by lip-fitted indexing plate, with concentricity held to .0005", and with an unskilled driver.

This latter statement isn't, of course, *literally* true—for by tedious hand methods it is possible for a highly skilled machinist to shape a part to any required specifications.

But consider the problem of Morgan Construction Co. of Worcester, Mass., world-renowned engineers and builders of complete rolling mills for steel companies. They required 20 mating parts like the one illustrated, for a powerful drive. The 40" heat-treated steel tubes weighed 350 pounds, had an inside diameter of $7\frac{7}{8}$". To form the 32 slots (and these slots didn't run completely through, they were only 30" long!) meant a stock removal of just over 50 pounds, and an overall accuracy of .002" in spacing.

The job was simple, on our 3½L LAPOINTE Horizontal Broaching machine. Perhaps you're puzzled, right now, about an especially tough job. Why not ask Lapointe to look it over?

New Bulletin available on Lapointe double ram horizontal broaching machines. Ask for DRH 200-2.

THE *Lapointe* MACHINE TOOL COMPANY

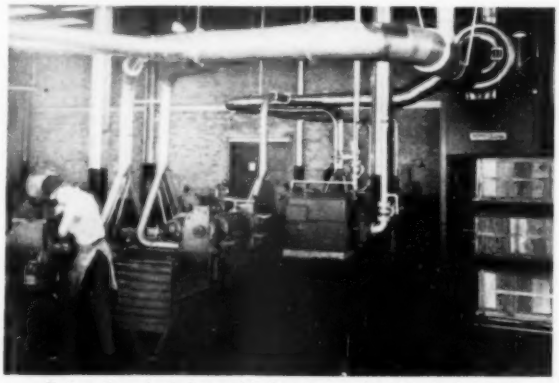
HUDSON, MASSACHUSETTS • U. S. A.

*Branch Factory • Edgware • Middlesex • England*

HUDSON LAPOINTE MASS.

**THE WORLD'S OLDEST AND LARGEST MANUFACTURERS OF BROACHES AND BROACHING MACHINES**

# ROTO-CLONE gives dust a One-Way Ticket



*Battery of stand grinders used for foundry snagging operations is served by two Type D Roto-Clones.*

DUST can't linger here to cloud the atmosphere, foul-up equipment and irritate workers. The moment it is generated, it's on its way out via Roto-Clone*.

This battery of stand grinders used for snagging castings is served by two Type D Roto-Clones installed back to back. Note the compactness of the installation. Location of the Roto-Clones at dust source eliminates long, costly pipe runs.

Constant efficiency, uniform air volume, small space requirement, low cost and ease of installation—these are the features of the Type D Roto-Clones that have made this unit a leader in the industry's winning battle over dust.

A Type D Roto-Clone Dust Control System may be installed as a central type with main duct and branch connections (as pictured), or as an individual unit serving a single dust-producing operation. For complete information, call your local AAF representative or write direct to:

**IT'S A FACT!** More grinders are exhausted by the Type D Roto-Clone than any other type of dust collector. Bulletin No. 272 A tells the story. Write for it now!

**AMERICAN AIR FILTER COMPANY, INC.**

**207 Central Avenue, Louisville 8, Ky.**

***In Canada: Darling Bros., Ltd., Montreal, P. Q.***

**Roto-Clone is the trade-mark (Reg. U. S. Pat. Off.) of the American Air Filter Company, Inc., for various dust collectors of the dynamic precipitator and hydrostatic precipitator types.*

AAF

**ROTO-CLONE®**
**DUST CONTROL EQUIPMENT**


## *Dear Boss . . .* continued

Bigtown Machinery Co. Ltd.,
Bigtown, 7 July.

Mr. Ben Murphy, Erector
Bacwudton Manufacturing Co. Ltd.,
Bacwudton, Ontario.

Dear Ben:

We knew you were a good mechanic, but had no idea your mathematics were so good. We like your idea of taking Monday off at straight time, and working all day Sunday instead at double time. And we note you ran two shifts all one week, or how did you manage to get 100 hours in?

Nice try, Ben, and I guess you got what you wanted. You are back on a monthly salary again, retroactive to 1st of June.

Yours sincerely,
W. King
Manager

WK/am

P.S. Did you forget the manager's name? Or perhaps I'm forgetting he's your twin.

W. K.

• • •

TELEGRAM—COLLECT

8 JULY

BIGTOWN MACHINERY CO.
BIGTOWN
SEND NEW PITMAN PART 3 DRAWING C4578

MURPHY

• • •

TELEGRAM—COLLECT

12 JULY

BIGTOWN MACHINERY CO.
PITMAN RECEIVED STOP STILL WONT FIT STOP SEND DRAWING C4578

MURPHY

• • •

TELEGRAM—COLLECT

14 JULY

BIGTOWN MACHINERY CO.
BIGTOWN
DRAWING RECEIVED STOP SEND GUY WHO DREW IT

MURPHY

• • •

Bigtown Machinery Co., Ltd.,
Bigtown, 14 July

Mr. Ben Murphy, Erector
Bacwudton Manufacturing Co. Ltd.,
Bacwudton, Ontario.

Dear Ben:

We have discovered a slight error on drawing C4578 which we are correcting and will send you another new pitman. What does the Bacwudton Co. mean when they order a

spare special double-length chain 110 in. long consisting of 220 links each 1 in. long? We queried them on it, and the manager wrote back some drivel that he counted the links himself and it's a wonderful idea, although he still doesn't see how we do it.

Yours sincerely,
W. King,
Manager

WK/am

. . .

Bacwudton Hotel,
July 18,

Dear Boss:

You remember the bottle of rye I lost over a little bet? Well I didn't want the company to feel I was a guy who lost bets for them, so you'll be glad to hear that the company isn't in the red over that bottle any more. I won it back.

When I put that 110-in. chain on, somehow I got a half twist in it when I joined the two ends together. The twist was in the slack side on top, where it passes behind the plate, and can't be seen. Well, just as I quit cursing, who comes along but the manager. "So," I think, "I'll get some fun out of this anyway." So I say to the manager, "Say, you are not supposed to see this chain. Wait until I get the cover on." "Why not?" says he. "Because we still haven't got patent protection on it."

With that he squats down and really looks it over. "What are you giving me?" he says, "It's ordinary roller chain." "Ho, ho, that's what you think." "Prove it's not." So I take a tape and pass it right around the chain. "How long?" says I. He looks at the tape. "110 inches." "And how long is a link?" "One-inch pitch." "So how many links are there?" "110." "And if I say there are twice that many?"

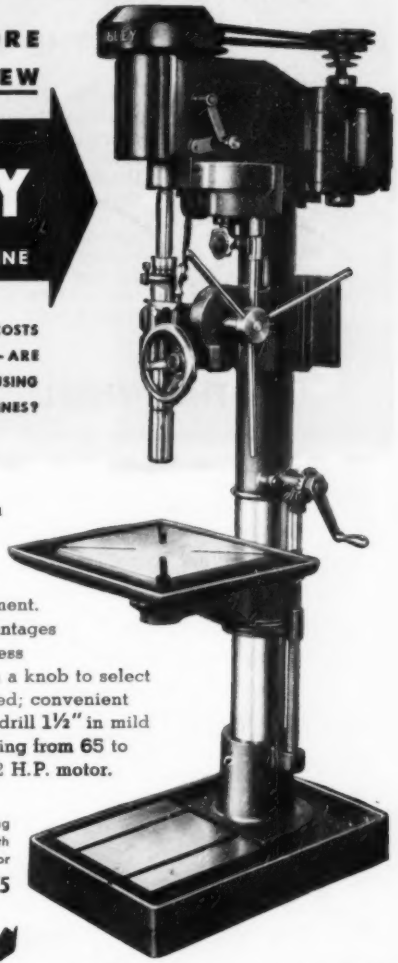
He looks it over, and it's obvious that the chain can only go around the two sprocket wheels he can see. He can't see the twist, but he can see there isn't any room for a hidden loop or a third sprocket or idler wheel or any trick like that. He

*". . . special double-length chain 110 in. long, with 220 1-in. links . . ."*

# Take high cost labor off obsolete machines

**PRODUCE MORE WITH THE NEW**

**SIBLEY**
**MODEL C-20**
**20" DRILLING MACHINE**



**10 YEARS AGO LABOR COSTS WERE 1/2 OF TODAY'S—ARE YOUR MACHINISTS NOW USING THE SAME DRILLING MACHINES?**

Install a new model C-20 in your plant and make a comparison with production obtained from your present drilling equipment. It will demonstrate the advantages of such features as easy access to controls—where you turn a knob to select the proper geared power feed; convenient shifting of V-belt; power to drill 1½" in mild steel; 8 spindle speeds ranging from 65 to 1360 R.P.M. powered by a 2 H.P. motor.

Model C-20 Sibley 20" swing drilling machine complete as illustrated with 2 H.P., 3 Phase, 60 Cycle, A.C. motor and magnetic type starting switch . . . . . **$849.75**

*F. O. B. South Bend, Indiana*

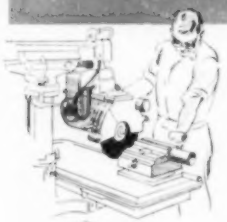
**SIBLEY**
**MACHINE & FOUNDRY CORP.**
**28 EAST TUTT STREET**
**SOUTH BEND 23, INDIANA**

**SIBLEY MACHINE & FOUNDRY CORP.**
**24 East Tutt St., South Bend 23, Indiana**
Send Catalog No. 67

Name_____ Title_____
Company_____
Address_____
City_____ State_____

## DO YOU TIME YOUR CUT-OFF OPERATIONS . . . IN HOURS . . . OR MINUTES . . . OR SECONDS?

**If it's a matter of hours . . . or even minutes . . . here's the practical way to cut it to seconds . . . and to cut costs at the same time!**



### THE METHOD

*Abrasive Cutting!* Regardless of the material you cut . . . or whether the operation is in the toolroom, stockroom or on the production line . . . the abrasive method means cutting time is actually measured in *seconds* . . . means you cut to size within a few thousandths . . . means a finished surface that generally requires no further machining. Important facts that add up to just one thing . . . *reduced costs!*

### THE WHEEL

In our long experience as *specialists* in abrasive cutting, we have developed a wide range of wheels (Rubber Bonded and Resinoid Bonded) in a scale of sizes and properties, each with specific characteristics. Selecting the *right* wheel best suited to meet the requirements of your job is an important part of our business. Investigation costs nothing . . . and it may pay you well to investigate. Give us full particulars of your cutting operation . . . we will gladly make recommendations that will assure better results, at lower costs.

**DO YOU CUT**

**STEEL**
**BRASS**
**NICKEL**
**ALUMINUM**
**GLASS**
**PLASTICS**
**TUBING**
**TUNGSTEN**

**IF SO CALL AN**
*Allison*
**ABRASIVE CUTTING EXPERT**

Allison
ABRASIVE CUTTING WHEELS

**FREE ON REQUEST**
Here are the complete facts on Abrasive Cutting and Allison Wheels . . . yours for the asking. Send for your copies today.
THE ALLISON COMPANY
256 Island Brook Ave., Bridgeport, Conn.

SAL49


## *Dear Boss . . .* continued

even feels the chain where it is hidden to be sure, but he still misses the twist. When he is satisfied, he says, "I got a bottle says you're a liar." "You are on," says I, "Put your initial on one link so you'll know it when it comes around again, and I'll turn the sprocket wheels slowly while you count."

The Manager gets down on his hands and knees, and initials one link. I turn the wheel slowly, and tell him what a wonderful idea it is—twice the number of links in a chain of a certain length will make it wear twice as long. Meanwhile he counts. "1, 2, 3, . . . 109, 110, slowly now, 111, 112, stop! You've rubbed off the initial. You've fixed a pad somehow to rub it off." "No, honest I haven't. Keep on counting."

What he didn't know was that the mark he had put on the near side of the chain had passed over onto the far side at the twist. When he was counting 110 the mark was there, all right, but he couldn't see it because it was on the back of the link. The chain had to go right around a second time before the mark would appear again on the front. Which it did, just as he counted 220.

After he had counted to 220 a second time, and measured the chain twice, too, I won back the bottle for the company. And that's how come he ordered a chain 110 in. long with 220 1-in. links.

Yours truly,
Ben.

P.S. Please send my mail addressed to General Delivery. All letters to the company here go first to the manager.

. . .

Bigtown Machinery Co. Ltd.,
Bigtown, 20 July.

Mr. Ben Murphy, Erector
Bacwudton Manufacturing Co. Ltd.
Bacwudton, Ontario.

Dear Ben:

Kindly remember you are representing the Bigtown Machinery Co. Ltd., and are dealing with a very good past and we hope, future, customer of ours. CUT OUT THE KIDDING.

First you proved the manager a liar by getting him to sign your swindle sheets, and now you've proved him a fool with your twisted chain. You are on the spot. Apologize to him, and explain about the chain without offending him.

Yours sincerely,
W. King
Manager

Bacwudton Hotel
July 25.

Dear Boss:

I enclose the envelope of your last letter, as I got it. In case you can't make out the handwriting on it, it says, "Opened by mistake by the office-boy." I'd swap checks with that office-boy any pay day!

So you can compare handwriting, I also enclose a little note I received from the manager, inviting me to Sunday dinner.

Suggest again you send my mail to General Delivery.

Yours truly,
Ben.

P.S. I have a hunch the manager is annoyed about something. I also have a hunch that there is no need to explain about the chain. Could be that spot you mention has moved south?

P.S. 2 I am sending you back the copy you loaned me of "How to Win Friends."

• • •

Bacwudton Hotel,
Aug. 1.

Dear Boss:

Rush that new ratchet wheel like I wired. It's going to hold us up another week.

Boy, will I be glad to get out of this dump! Whooo, whooo—I can hear the train whistle now, calling me. What a hole this town is.

You got one swell cover-up guy who made that ratchet wheel. He has probably left by now—guess he just covered up his mistake long enough to find another job. Unless he's head of the complaint department by now. He deserves to be.

There are 100 teeth on that ratchet to give exactly 0.01-in. feed per tooth. The darn feed was sometimes more, and sometimes less. I couldn't figure it. I worked on it for two days. Looked like something was slipping, or lost motion, or spring. I counted those teeth a dozen times. There were 100 all right.

Then, by gosh, I sure earned that Christmas bonus you are going to give me. You know what that son-of-a-gun done? The guy cut only 48 teeth on one half of the ratchet wheel, so to make up the 100, he changed the size of the teeth and cut 52 smaller ones on the other half. What a pal!

If he is still there, don't fire him until I get back. I'd like to pay him a little social visit.

On second thought, maybe you'd better make him a foreman. He'd feel right at home then with that crowd.

Anyway, rush me a ratchet P. D. Q.

*(Continued on page 166)*


**The Finishing Touch in Filing Calls For....**

**AMERICAN SWISS**
**Swiss-Pattern FILES**

To give a job those final finishing touches, you need skilled craftsmanship—*plus* the finest of files. With "American Swiss" Swiss-Pattern files, you'll find it easier to handle such intricate surfaces as small fillets, holes, slots, curves and edges.

The reason? Every "American Swiss" Swiss-Pattern file is specially heat treated with automatic control to assure uniform hardness. Many sizes are made to tolerances as close as ±.002 in. Their teeth are clean, sharp, accurately cut. And finally, a rigid inspection system eliminates all imperfect files. All rejects are immediately scrapped in an acid bath.

You can select the "American Swiss" Swiss-Pattern files you need from our large line of more than 3,000 different sizes, cuts and shapes. Be sure of getting exactly the right file for those final finishing touches by specifying "American Swiss."

• *Buy From Our Authorized Dealer*

**AMERICAN SWISS FILE & TOOL COMPANY**
**Elizabeth 1, New Jersey**

*Also manufacturers of American Pattern files, milled curved tooth files, rotary files, and mechanics' hand tools.*

ASK FOR THEM BY NAME

*American Swiss*

**SWISS PATTERN FILES**

# Simplification of Production and Cost Controls Saves for SUNBEAM

**Sunbeam Corporation, Chicago, simplified control of production, costs and payroll through McCaskey "Visible-Filing and One-Writing" in 1921; has extended control several times with increase in facilities for manufacturing the "Shavemaster" and other Sunbeam electrical products.**

McCaskey provides their central production office with visible control over all the work-in-process by piece part numbers and operations with a minimum of clerical overhead, according to Mr. John J. Kaser, Sunbeam Production Manager. Thousands of posting operations are saved, for example, by quickly filing copies of control tickets on McCaskey Planning Boards for this control.

The visualized tickets provide a progress record by operations (frequently as many as forty) that is available at a glance, as shown in the illustration above. They also constitute a complete record of work-in-process that is both accurate and up-to-date. Errors and delays seldom occur since the tickets are identical copies of certified original records.

Additional copies, made without additional writing, promptly provide the Payroll Department with data for computing incentive and non-productive earnings, the Cost Department with identical information for analyzing actual performance in comparison with standards, and Employees with a "receipt for pieces made" and a later verified record of earnings.

This one multi-copy ticket thus provides the data for complete production records and control and makes them available with a saving of thousands of hours of clerical work annually. Continued use of the McCaskey fundamentals of "One-Writing and Visible-Filing" for twenty-eight years indicates the flexibility of McCaskey Controls and their adaptability to rapidly expanding and changing requirements.

***Write for a demonstration and suggestions for an application to your particular needs—or send for a copy of "The ABC's of Production Control" and other descriptive folders.***

*McCaskey* INDUSTRIAL CONTROLS

PRODUCTION • INVENTORY • TOOLS • COSTS • PAYROLL

THE McCASKEY REGISTER COMPANY, ALLIANCE, OHIO

McCaskey Systems Ltd., Galt, Canada  The McCaskey Register Co., Watford, England

## *Dear Boss . . .* continued

and be sure there are 100 teeth on it, all the same size.

Do me a favor, Boss, and loan me the rig for drilling square holes. I want to have a little fun, and win a few bets from the lads in the machine-shop, here. I bet these hicks have never seen a square hole drilled.

Yours truly,
Ben.

• • •

Bigtown Machinery Co. Ltd.
Bigtown, 4 August.

Mr. Ben Murphy
General Delivery,
Bacwudton, Ontario.

Dear Ben:

New ratchet wheel will leave here tomorrow. Let us know when you will be ready to test, as we want the designer, Higgins, to be present.

Cut out the fooling in the machine-shop. We're not shipping tools just for your little jokes.

Yours sincerely,
W. King,
Manager

WK/am

• • •

Bacwudton Hotel
Aug. 8.

Dear Boss:

Seeing you weren't sport enough to send me the square-hole drill, I got to confess it is going to cost you another bottle, over a little bet I lost. I wanted to get even again, that's all. The bottle is hidden in my expense account, Boss. See if you can find it.

You would have got caught on this one too.

I wanted a left-hand thread cut in the gusher flange. So I take it down to the machine-shop, and ask them politely if they can do it, or will I have to show them how. I didn't expect them to have a left-hand thread-cutting tap anyway.

Well, a wiseacre there says no, they haven't a left-hand tap, but that's all right; he'll turn the flange upside down and thread it from the bottom with a right-hand tap. I sort of sneer at that, and first thing I know, there is a little bet on.

He shows me a right-hand tap pretty quick, and next thing, he's threading the hole from the bottom like he said. I squawk a bit; then he hands me the flange hot from the drill. Well, I curse a bit, as I pick it up off the floor and nurse my hand where it burned me. Then I say, "Hey, this is a left-hand thread." "That's what you asked for." "Then you must have switched taps on me." "There's the tap, still in the drill. Look it over."

*". . . upside down, and backside foremost, but I couldn't get the left-hand nut to go on the right-hand bolt . . ."*

And, Boss, it was a right-hand tap in the drill. You explain it. Anyway, I had to pay up like a gentleman.

That night I didn't get to sleep until 3:00 a.m. I took a left-hand bolt and nut, and a right-hand bolt and nut up to my room, and I threaded the nuts onto the bolts right side up, and upside down and backside foremost, but no matter what I did I couldn't get the left-hand nut to go on the right-hand bolt and vice versa. So I figure someone took me for a ride.

Anyway, it's an ill wind, etc., for now the manager is real chummy again. Guess he figures we're even.

Yours truly,
Ben.

P.S. Ratchet wheel arrived. Will be ready to test next Thursday, August 18.

• • •

Bigtown Machinery Co. Ltd.,
Bigtown, 11 August.

Mr. Ben Murphy
General Delivery,
Bacwudton, Ontario.

Dear Ben:

Higgins will arrive Thursday morning, 18 August.

With regard to the left-hand thread, I remember the manager telling me he had an amateur magician in his machine shop, who always mystified the kids and village morons with his sleight-of-hand tricks.

If you think we are going to pay for all your bets, you are badly mistaken. I was going to deduct the price of a bottle from your last expense sheet, but for once you had every item covered by a receipt.

Please remember all these letters are filed away for posterity in the contract files. Right now it takes an engineer three times as long to consult a file containing any of your letters (and he usually seems to have to get help from another engineer, too) than if Joe happened

*(Continued on page 168)*

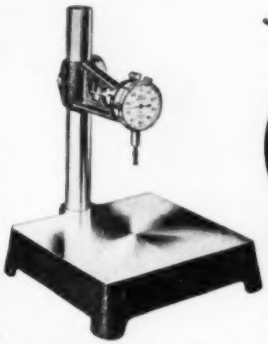

AMES

CONTINUOUS ACCURACY · RUGGED CONSTRUCTION · HIGH QUALITY MATERIALS · LOW FRICTION · EXTREME SENSITIVITY

**INGENUITY PLUS - -**

. . . the combination of Ames Dial Comparators shown below will allow you to handle practically all of your measuring and control problems.

**No. 1 Dial Comparator.** This model has a table which is adjustable for height. The lever at left of dial is pushed down to lift the indicator rack spindle. Any Ames Indicator can be attached, but the one regularly supplied is Model 202 with dial numbered 0-100, reading .001", having .250" range.

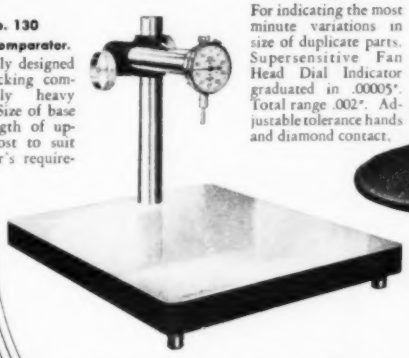


**No. 13 Dial Comparator.** The 8" x 8" cast iron base can be fitted with locating fixtures and V-blocks. The bracket supports any Ames Indicator, but regular equipment is Model 202 with dial numbered 0-100, reading .001", having .250" range. Bezel and dial turn to locate zero beneath pointer.

**No. 2 Dial Comparator.** Compact. Regular or dead weight contact pressure. Table dia., 2". Adjustable for "0" setting. Height 5 3/8"; weight 2 3/4 lbs.

**No. 26P Dial Comparator.** For indicating the most minute variations in size of duplicate parts. Supersensitive Fan Head Dial Indicator graduated in .00005". Total range .002". Adjustable tolerance hands and diamond contact.

**No. 130 Dial Comparator.** Especially designed for checking comparatively heavy parts. Size of base and length of upright post to suit customer's requirements.



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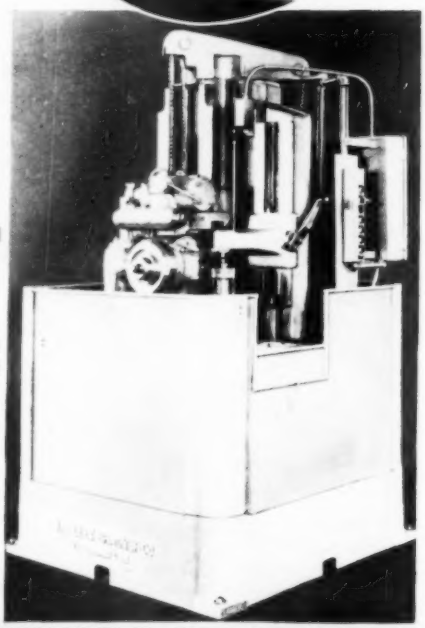
arranged expressly for use with carbide-tipped hobs.



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✓ Handles 8 pieces per load simultaneously.

Typical Hob expectancies:—

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✓ Hob spindle speeds to 1800 RPM.

✓ Yields about 15 to 1 over the highspeed steel process.

Write . . . wire . . . telephone for further particulars and prices.

The LEES-BRADNER Company
CLEVELAND 11, OHIO, U.S.A.

## Dear Boss . . . continued

to be the erector on the job.

Keep them brief.

Yours sincerely,
W. King
Manager

WK/am

. . .

*Bigtown Machinery Co. Ltd.,*
*Service Engineer's Report*
18 August.

From J. Higgins, Designer
To W. King Manager
Subject Bacwudton Manufacturing Co Installation.
Written at Bacwudton.

I arrived at Bacwudton this morning and immediately checked in at the town's only hotel, where Ben is supposed to be staying. However, the clerk had no record of Ben, although when I described him he remembered a fellow like that, who comes in once a week and writes a letter on hotel paper.

I went to the mill at 9:00 a.m. and found a regular convention. All the directors seemed to be there, with some of their wives, and a half dozen of our competitors had salesmen present. But no Ben.

This mob trailed me everywhere I went and clamored to see the machinery run. I couldn't even wash my hands without a couple looking over my shoulder. I didn't like to start up without Ben, although his helper was insistent that it was ready to go. I phoned the police station and hospital, but still no Ben.

(Before you worry too much about Ben, let me assure you he wishes to explain the circumstances to you himself.)

The machinery looked pretty good. Ben did a good job, and it was all shined up, ready to go. So I figured I'd have to chance it without Ben.

I did everything by the book, opened all the air vents, checked the oil, took a deep breath, and started the pumps. There was a lot of air in the system, you could hear it whistle through the vents. I thought it would take at least ten minutes to fill with water. I tried to herd my followers back a bit. But they wouldn't budge.

Suddenly the water reached the vents, a lot sooner than I expected, and before I had a chance to shut down the pumps. And by a strange coincidence, every one of those vents seemed to point right at the walkway where the sightseers were gathered. And the first water discharged was a nice mixture of rust, oil and grease.

The women screamed, the men cursed, but the mill manager was a

good egg (or maybe he was hidden in the back row). He started to laugh, and everyone finally joined in.

After that, the trial was a big success. Everything went like clockwork, and everybody was happy.

I expect a week here will be enough for Ben and myself to tune it up.

Signed: J Higgins.

P.S. I am a bit short of cash, so would appreciate it if you would kindly attend to the enclosed expense account immediately. The big item under laundry is for drycleaning 3 dresses, 16 suits, 11 hats and one umbrella. The last was carried, folded up, by one of the ladies. At least you can claim now that you have taken your competitors to the cleaners. We even took the pants off two of them. J. H.

* * *

General Delivery
Bacwudton, Aug. 19.

Dear Boss:

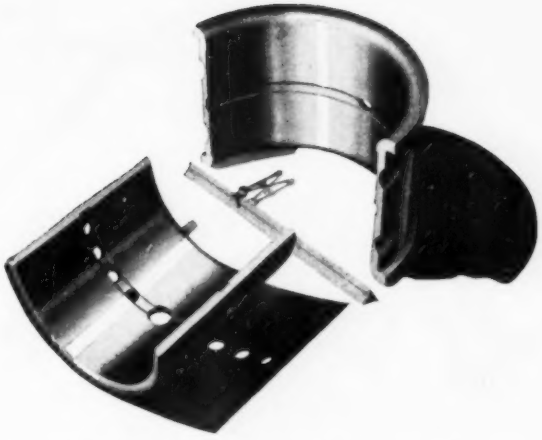
Higgins is a great designer, and this is certainly a nice piece of machinery you have produced. It's working slick, and the manager is as happy as a lark.

No doubt you are worried as to what happened to me during the test. Well, Boss, you know how I hate to start up a new machine with all the world and his neighbor pestering me. So I said to myself, "The unveiling may be on Thursday, but I am sure going to give it a good run on Wednesday."

Three times on Wednesday, I was all set to press the button. Each time I waited until the mill was so empty, you'd swear everybody must have died. Then I'd give the pumps one turn-over, and each time there was a crowd around me from nowhere, from the manager to the sweeper. Seemed like they dropped from the roof. I shut down quickly. "Just testing the motors to see they turn in the right direction," I say. That's how I get some water in the system, so it didn't take Higgins as long to fill as he expected.

So Wednesday night, Boss, I sneak back about midnight to really try it out. But I can't find the night watchman to let me in. I'm just giving myself a boost over the fence, when along comes a young giant of a cop. First thing I know, I'm down at the police station. "What's your name?" Habit gets the better of me, and darned if I don't blurt out "McTavish." Being Irish, I've always given a Scottish name when the going got tight.

(Continued on page 170)

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*Steel or Bronze Back*

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## CONTINENTAL makes them all and thousands more

Of all the 400,000 varieties of fastenings that literally hold our industries together, Continental makes a large proportion marketed under the famous HOLTITE trade name. Most of them are standard — screws, nuts, and bolts for every use in every industry. Others like the well-known HOLTITE-Sems and HOLTITE-Phillips screws are patented specialties and the famous HOLTITE-Thredlock, Locktite and Tap screws were first designed and produced by HOLTITE. Sometimes a fastening engineered by HOLTITE for one industry finds an unexpected use in another. Often a HOLTITE-*Engineered* fastening will replace several parts that a manufacturer is using. Why not discuss your fastening requirements with a Continental Sales-Engineer. He will focus on your requirements all the broad industrial-fastening experience and ingenuity of Continental. Remember Continental is constantly improving HOLTITE products, lowering their cost and broadening service.

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A. This chrome plated Phillips screw used on passenger guard rails in busses has a special shaped head to dress up appearance and provide additional shear resistance.

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D. An example of a HOLTITE "Lock-Tite" screw. The screw and lock washer come in one solid piece. With but one part to handle, assembly steps up and waste drops to a minimum.

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**CONTINENTAL SCREW COMPANY**

1904 NEW BEDFORD, MASS., U.S.A. 1949


## *Dear Boss . . . continued*

*"I'm just giving myself a boost . . ."*

That's why Higgins couldn't locate me, Boss. And it took me all night and the next morning to convince those cops that my business was legit, and that there was no hard feelings on my part about the accidental black eye the young copper was sporting.

And I know you won't begrudge the bottle I got young Higgins to buy for the sergeant. That kid doesn't even know what "entertainment" means on his expense sheet.

Now as for that little matter about me not staying at the hotel. I suppose you are a bit puzzled, seeing as how I've sent in hotel receipts for every week.

Four weeks ago was my wedding anniversary. And nothing would suit the wife but what she come up for the week-end. Well, the hotel manager and I are like brothers, Boss, so he didn't raise the ante on the room. After all, he didn't have to change it any. So nothing would suit the wife but that she stay on.

This is a commercial hotel, with a long stairway leading down into the lobby. All the chairs in the lobby line the wall, and there is a traveling salesman as a fixture in every chair. I think half of them don't bother taking a room. And everytime the wife came down those stairs, every head would turn, and the air would just about hum with so many guys thinking the same thing. No woman minds the odd whistle, but this was so concentrated it stunk. So nothing would suit the wife but what we get out of there. Well, she and the manager's wife are like sisters by this time, so next thing I know we are living at the hotel manager's own home. We still pay the same board I paid when I was

alone, so that's how you get hotel receipts.

Well, Boss, this is a swell little town here. If you'll just send me a salary advance, nothing would suit the wife better but what we stay on here after this job is finished, for my vacation. That is, if you haven't another erection job right ready. I don't think you have, because I took three weeks less here than you estimated as possible.

Yours truly,
Ben.

• • •

General Delivery
Bacwudton, 26 Aug.

Dear Boss:

Thanks for the salary advance. And despite your crack, I'll have no trouble telling when I'm on vacation. One difference is I don't need to write you.

Yours truly,
Ben

P.S. Machinery working fine. It sure was a nice design. I forgot to mention before the changes I had to make to get the thing to work at all. I gave a 2-page list of them to Higgins. That kid should get out more—he seems awful pale. We had all the work on the changes done here. Higgins has got the drawings I made. I hope you had an extra 20% in on the price of this job for contingencies. I guess the mill manager will backcharge you for the work he did for me. He's a swell guy all the same. Made me a present of a big bottle, and a nice offer too. The wife and I are going to fish at his camp. But don't worry, Boss; I'll be back.

P.S. 2 Talking of bottles, I forgot to mention that one you couldn't find in my expense account: You had already paid for it two weeks before. You see, I was sure something would turn up.

P.S. 3 Boy, how the fish are biting!
Ben.

*"Boy, how the fish are biting!"*

# Threadwell Tools do many jobs

# try them on your tough ones

***Drilling problems are no laughing matter***

Improper lip clearance is at the bottom of many drilling problems. Too much clearance often leads to the breakdown of cutting edges, while too little clearance impairs the cutting effectiveness of the drill and throws serious strain on the machine. Lip clearance is seldom a problem with Threadwell Twist Drills, because from start to finish rigid control is maintained to guarantee uniformity of every Threadwell Drill. Even the finest steel which goes into Threadwell Twist Drills is kept under constant testing and analysis to ensure that *every* Threadwell Twist Drill is as accurate and long lived as modern manufacture can make it, and that it produces the quality that is a Threadwell hallmark.

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See your local supplier, or write for Bulletin 435R

TIME

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A NEW LINE OF
COST-CUTTING
CARBIDE-TIPPED
End Mills

**Lovejoy's** new end mills and holders are designed for lower cost metal removal — proved on every job where they are running. Two-flute mills are available from ½" to 1" in dia., and four-flute from ¾" to 2". All have 1" dia. shanks and are tipped for cutting cast iron or steel. Single-flute end mills are available at low cost for testing before using multi-fluted end mills on production jobs. The well-known Lovejoy positive-locking device is used to hold the end mills immovably in the holders and provides quick change of cutters. Another type of adjusting shoe may be provided for use with standard set-screw type holders.

Lovejoy end mill holders are available with Nos. 4, 5, 6 and 7 Morse Taper, Nos. 7, 8 and 9 B & S Taper, and Nos. 40 and 50 N.M.T.B. adapter.

Lovejoy engineers are at your service to recommend standard sizes or design special end mills for individual needs.

*Write for new*
*End Mill Bulletin*

**"TOOL BITS"**

*Lovejoy makes a complete line of flywheels which are a valuable addition to most end mill jobs. They increase cutting life, lengthen runs between grinds, improve finish and reduce work spoilage. Write for Lovejoy Flywheel folder or ask for free help in choosing the right type for your jobs.*

Lovejoy
TOOL COMPANY, INC.
SPRINGFIELD, VERMONT

# ROUND TABLE Discussion

## DEADLINE OR DEAD TIME

This Round Table subject of a year ago brings to mind a case in which the wash-up period caused trouble between two foremen. In this particular plant the foremen have a group which meets to discuss mutual problems once each month. At a recent meeting, Foreman B complained that Foreman A allowed his employees to wash up five minutes before quitting time, while Foreman B made his men stay at their machines until shift end. Further, Foreman B complained of difficulty in keeping his men in line because Foreman A was lax with his men.

Unfortunately Foreman A was not at the meeting, so he heard the complaint secondhand and was naturally resentful. Further, he had noticed Foreman B's men washing up a half hour before shift end, then returning to their machines to work until the bell. Foreman A had not mentioned this to Foreman B because he felt he should not interfere in Foreman B's business, and he felt that Foreman B should have told him of his difficulty rather than airing it in an open meeting.

The result was a special meeting the following week in which Foreman A brought up the subject of washing up before shift end. Most foremen agreed that their men should work until the end of a shift. Foreman A was agreeable but pointed out that they must all cooperate in uniform enforcement of the rule or the policy would soon break down. This in turn would lead to further breakdowns in policy on other matters.

A. E. Salmon
Foreman, Wilkening Mfg. Co.
Philadelphia 42, Pa.

•

## MEN ONLY?

While the potatoes are cooking, I'll get off a note to you. It so happened that as I was looking through the pages of an old issue of the *American Machinist*, which my husband insists upon cluttering up my house with, I came upon one of those Round Tables that Harry's constantly talking about.

Naturally, the title "Men Only" aroused my feminine curiosity and I proceeded to read on. My heart filled with pride as I read through that

conversation, but when I came to the part where Ed made fun of me and my kind I got mad—I'll bet he's a big hairy brute. Certainly we have to go to the rest room occasionally to powder our noses; shouldn't every employee keep up his or her appearance? Then noting the editor's comment at the bottom of the page: "Have women a place in metal-making production?" I left my slave cell and went to my desk in the front room where you'd find me now if you'd drop in—but make it snappy 'cause Harry'll be in pretty soon expecting me to make a fuss over him.

"Can women take it?" Listen, Big Boy, certainly we can take it. Any woman who has lived with a machinist as long as I have can take anything. After listening to my worse-half brag about the close work he has been doing day in and day out for the past fifteen years! Can I take it! Haven't women shown in the past ten years that they are just as good as most of the conceited men in the shop?

During the war I ran a drillpress and I know that I turned out more of those little doohickies for P38's than any bragging male. What possible disturbance can a woman create in a shop? That's one of the foreman's duties to keep down disturbances. As far as "appeal" being a disturbance I can't see it. The men and women all look alike in their coveralls except possibly a little difference in contour and a couple of bumps.

In all my days on that job I hadn't seen anything out of place—oh, I did happen to tell one smart—what was that much discussed term that Missouri Harry made just recently?—where to head in at because of some fresh crack he made. Believe me, that bird didn't bother me again! Well, Mr. Editor, I got it off my chest and I trust that you don't think me too forward in violating the field heretofore predominated by the egoistic sex—oh, oh! My potatoes are ruined!

Evelynne Roundbottom
Ontario, Calif.

•

## WORKING THE WILLING HORSE

Every foreman has specialists to help him carry his many responsibilities. Routing the work through these men in accordance with their abilities and capacities makes his tasks easier. It time these men become the foreman's crutches and he becomes helpless when one is missing.

When the emergency order arrives at his desk, he immediately knows which men he can depend upon for

Those who use small, precision gears as component parts of their completed assemblies can profit by the convenience and economy of producing them on the Hamilton No. 1 Precision Gear Hobber.

Built to extra close tolerances, the Hamilton No. 1 is designed also for super-rigidity to provide *lasting* precision under heavy loads. Hobs spur, spiral, and bevel gears, gear sectors, splined shafts, pinions, and worm gears of fine-watch precision and on high production schedules.

Speed, feed and indexing can each be set independently of the others. This feature, plus the wide range of Hob Spindle speeds (109 to 1259 R.P.M.), provides the machine with extra versatility; cuts set-up time far below previously acknowledged minimums and permits easy adjustment of speed and feed to the requirements of material being worked or gear size being hobbed.

The ideal Gear Hobber for use in shops where set-ups are frequent or in shops where runs are long.

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Our prices are based on diameter and length of tool rather than on the shape required. The savings we are currently effecting in other shops is such as to warrant your immediate investigation. Ask for catalog showing sizes and typical types. Send blueprints of tools required for our quotation.

●

*Available to your specifications in a wide range of diameters in various lengths.*

**INDUSTRIAL CARBIDE TOOL CO., Inc.**

**33 Harmon Street — WORCESTER 8, MASS.**


accuracy and speed. If his men are accustomed to rush assignments, they will fall in stride with little confusion and the foreman can continue with his regular routine and a clear mind.

The smart foreman will try routing some of these jobs through other men at intervals to develop their facilities in the event one of his regulars is ill or leaves. In the small shops, the specialist is usually one man who is constantly working on the ticklish or rush jobs. As long as he has the patience and stamina, he is assured of a steady position. When he becomes conceited or cocky it is because the foreman has lost his grip on the man and will soon have to be humble to him when the special orders are assigned. In time, if the foreman doesn't develop a new specialist, he will become a slave to the former one.

The foreman is rather fortunate if he has a willing worker who looks forward to rush assignments, and constantly pitches in as if it were part of his regular duties. In return, the foreman should express his gratitude and extend special privileges within reason. Slobbering over the man and hanging orchids on his tool box is the quickest way to have him fall down on the job. Issuing instructions to the man as if he was obligated to carry them out is just as bad. A little discretion on the part of the foreman will let the worker know that his extra exertions are being appreciated and the latter will expect no more. When a new man shows signs of being capable of handling these special tasks, another one should be assigned to assist him so he can become experienced in similar work. This cannot be done overnight and many disappointments will occur, but what foreman's task at some time or another does not include a heart break?

Frank J. Zarnowski
Rutherford, N. J.

●

Every organization has "willing horses." There are several reasons for these men, for some like to work just for the pleasure of working, some because they think it makes their jobs more secure, some for the extra money it brings in, others simply because they are asked to do so.

It has been the privilege of the writer to observe some of these people. Here is one shot about this overworn subject:

One man liked to work and thought that every hour he put in was to his credit. This man did all he could do push production. In the course of

time, he had more overtime than any man who worked in his department. This continued for more than a year; then he began to slow down gradually during the day, and this was noticeable to his foreman. The foreman inquired as to his health and the man made the complaint that he was tired all the time. The following week he was ill and spent three weeks in bed.

Upon his return he worked only the regular working schedule, but mourned that other men were getting the gravy. He was not content with his own endurance, became most dissatisfied with conditions, and finally quit.

Another man worked overtime on rush jobs as they came along, but soon asked to be relieved of it. The foreman told him that, as there were only two machines which could do such work, there was a bottleneck in the production line, hence, the need for both machines to be kept busy the extra time.

Besides overtime pay, he was offered a bonus to keep on, but he requested a change of work. The firm granted his request, but immediately the percentage of scrap began to rise because of the inability of the new operator to get out perfect work.

The first operator was ordered by the foreman to return to his former operation. He did, but refused to work overtime. The foreman became rattled and would have fired him, but the personnel department interfered.

The upshot was two men on days and two on nights of ten hours, so the two machines were kept operating 18 hours per day—and still they could not keep up with the shop demand.

Finally the two day men devised a plan whereby two chucks could be worked on each machine. After a trial, the trouble was overcome and all lived happily, but the night shift was retained.

In keeping strict records of workmen and the amount of product each turn out, their constancy on the job seems to have a certain relationship. This is proved by plotting curves for the amount of time at work, the quantity of product and other items which have a bearing on the subject. It will be found that the man who works regular hours, produces at a regular rate, stays on the job the most hours and days per year, is the most profitable man to hire. A large corporation has checked this very carefully, and it has proved out in their six plants, each making a different product.

F. H. Stebbins
Worcester, N. Y.


EFFICIENCY IS UP COST IS DOWN

WHEN YOU SPECIFY

RUTHMAN GUSHER COOLANT PUMPS ON YOUR MACHINES

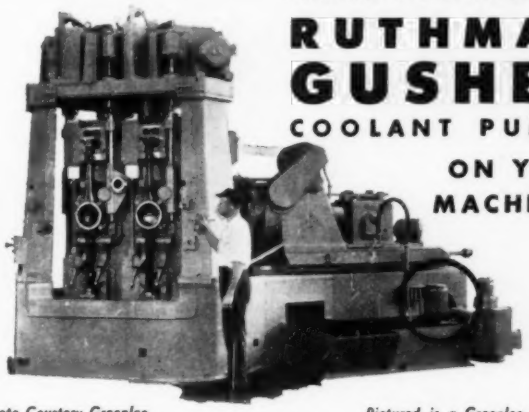


Photo Courtesy Greenlee Bros. & Co.

Pictured is a Greenlee Special Three Station Automatic Indexing Machine for Facing Differential Axle Housings, equipped with 1 H.P. Model 11025 Long Ruthman Gusher Pump.

Any way you look at it Ruthman Gusher Coolant Pumps give you better service.

*Efficient,* they deliver full flow of coolant instantaneously.

*Economical to operate,* they consume less power when throttled.

*Low in maintenance cost,* they give you year after year of trouble-free service, the reason, precision balance.

*Write us for our new catalog today.*

THE RUTHMAN MACHINERY CO.

1818 READING RD. CINCINNATI, OHIO

# In less than 5 months

# PAID for ITSELF

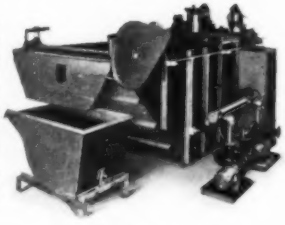
## The Actual Savings Record of One Plant Using HOFFMAN Flotation Equipment

**Based on One Year's Operation of 7 Centerless Grinders**

| | BEFORE | AFTER | SAVINGS |
|---|---|---|---|
| Total Shifts Operating | 2860 hrs. | 2860 hrs. | |
| Total Wheel Dressing | 2860 hrs. | 1450 hrs. | |
| Labor for Dressing | $3,646.50 | $1,823.25 | $1,823.25 |
| Time for Cleaning Coolant Tanks | 954 hrs. | NONE | |
| Labor for Cleaning Coolant Tanks | $1,216.35 | NONE | $1,216.35 |
| Grinding Wheels (est.) | $1,556.00 | $1,356.00 (est.) | $200.00 |
| Diamonds (est.) | $1,100.00 | $900.00 (est.) | $200.00 |
| Soluble Oil | $915.00 | $715.00 (est.) | $200.00 |
| **MAINTENANCE SAVINGS (Annual)** | | | $3,639.60 |
| **PRODUCTION SAVINGS Based on** 3,814 hours saved, evaluated at $5.00 per hr. per machine | | | $19,070.00 |
| TOTAL SAVINGS | | | $22,709.60 |
| **INSTALLED COST of Hoffman Flotation Unit** | | | $9,488.60 |

## Get the Figures for *Your* Operations

Detailed cost records kept by one manufacturer revealed these phenomenal savings with a Hoffman central system for coolant clarification. Along with better quality and faster grinding, this plant saved production labor formerly wasted on cleaning individual sumps. A Hoffman flotation unit provided automatic clarification with the amazing economies shown above. These same cost-cutting economies can be obtained in your plant. Write *today* for literature and a FREE Hoffman filtration engineering survey.



Models from 20 to 1,000 g.p.m.
Larger capacities to your specifications

FILTRATION DIVISION
U.S. HOFFMAN MACHINERY CORPORATION
211 LAMSON STREET, SYRACUSE 6, N. Y.
CANADIAN PLANT: CANADIAN HOFFMAN MACHINERY CO., LTD., NEWMARKET, ONT.


IS BUSINESS, BUSINESS?

Seniority should always be one of the factors for first consideration when a layoff must be made. The organizations that have the best equipment, including both men and machinery, are the most prosperous and have the best rating.

As machinery becomes worn or out of date, it has to be replaced with new. If better machines can be found, the old must be replaced.

While the human factor is not the same, it certainly should be given every reasonable consideration, for in the long run the two lines are governed by the same underlying principle. A shop run entirely on seniority rights is risking its efficency standard, as there is lacking the special encouragement for efficiency among its employees.

A workman's morals and quality of citizenship have a bearing on his worth and is entitled to consideration. An employee's time outside of shop hours is apt to be spent in doing what suits him best. If such time is not used for something worth while, that is, something that is of value to the community or his family, he cannot be considered a top-notcher. A man has an obligation to his neighborhood as well as to his family and employer.

John Mark May
Watervliet, N. Y.

•

We pride ourselves in our freedom. What man does in his own time in a way indicates whether he values that freedom or not. It has been said—and there seems to be a lot of truth in the statement—that the greatest weakness in our Democracy is the destructive apathy of its citizens.

"Business is business," my old dad used to preach, "keep your eye open for business—look after number one." No. Dad, you were wrong there, for Business is the Nation's business. Business, being the motive force behind Democracy, will rise or fall according to the success or failure of that Democracy. Business is an integral part of our way of life. All the political theory advanced by the squareheads will avail nothing if the moving force of Democracy isn't given the green light.

If Business is the effective force behind our form of living, it is incumbent that it take its rightful responsibility in the affairs of everyday life. The individuals in a manufacturing plant should be evaluated not only for their effectiveness in production but for the interest they show toward their fellow citizens.

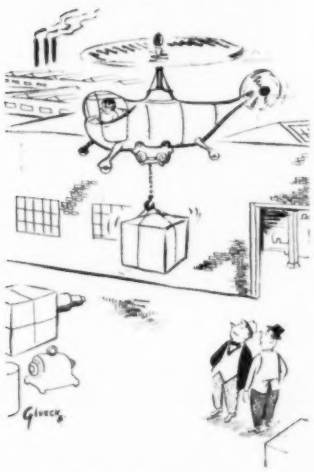
The manufacturer has a great re-

sponsibility to the nation in seeing to it that his business is not run for purely selfish reasons. He should see to it that it becomes a strong link in the whole economic chain. If an employee is made to feel that his interests in civic affairs are taken into consideration by his employer, when the time comes to choose between him and another workman, it will act as an incentive for him to be more cooperative in vital legislative issues.

Back in the olden days some rash individualist, interested in the financial returns regardless of the welfare of the nation, made a crack that reverberated: "The public be damned." While his remains have been long since interred, the least that can be said of him is that he was honest in expressing himself. Now we have another element working against the interest of the people, the lackadaisical chap who shrugs his shoulder and says: "Let George do it." In truth, what he means to say is: "Let Joe do it."

We all know, or should know, what "Joe" is trying to do. Evidence of this political lethargy is seen in the lack of interest in Local, State, and National affairs which are really turning on the heat for the conscientious representative at the present time. Yes, Mr. Dilemma, Business is business—it is the Nation's business. The sooner we all get down to business and give credit where credit is due—the man who shares his responsibility for the interest of others—the sooner will the affairs of this nation reflect sound justice between employer and employee.

John Homewood
Ontario, Calif.




*"Only trouble is, we can't use it for inside jobs."*

*Class discussion on application, design and maintenance of carbide tools.*

AND NOW--THE NEW

WENDT-SONIS

ADVANCED TRAINING SCHOOL

ON CARBIDE CUTTING TOOLS

**INSTRUCTIONS IN LATEST CARBIDE CUTTING TOOL PRACTICE**

New uses — new techniques are constantly being discovered for carbide cutting tools — practices which make for a better cutting job with less time, labor and expense. The Wendt-Sonis Advanced Training School packs into one week of comprehensive instruction all the latest *proven* carbide cutting tool methods and applications which can help do the job better at *lower* costs. Special instruction is devoted to proper maintenance of all types of carbide tools.

**LEARN FROM EXPERTS**

W-S instructors are practical, factory men who know their subjects well from actual experience gained in solving the many cutting tool problems of industry.

**LEARN BY DOING**

Learn by actual *doing* or *seeing* demonstrated, all the new ways of making carbide tools do a finer more efficient job.

**ABSOLUTELY FREE!**

No registration fee — no tuition — no books to buy. All that is required is the desire to keep informed on modern trends in carbide tooling.

*For*

TOOL ROOM FOREMEN
•
FACTORY SUPERINTENDENTS
•
DISTRIBUTOR SALESMEN
•
MACHINISTS
•
FOREMEN
•
PRODUCTION SUPERVISORS

WRITE TODAY FOR FULL DETAILS

FILL IN — TEAR OUT — MAIL TODAY

WENDT-SONIS Training School, DEPT. A-1
Hannibal, Missouri

Gentlemen:

I am interested in more details about your Advanced Training School on Carbide Cutting Tools! Please send complete information.

NAME _____

OCCUPATION _____

FIRM _____

ADDRESS _____

CITY _____ STATE _____

FOR LOWER GEAR MAINTENANCE COSTS . . .

# Look to PERKINS GEARS

**When you use PERKINS precision, custom-cut GEARS, you have done all that can be done to forestall costly rejects or undue maintenance costs due to failures or inefficiency in the power transmission system of your product.**

If you were to name the three or four chief factors that you, as a manufacturer of a product using *gears*, would insist on when choosing a supplier, wouldn't this be the line-up? (a) High quality. (b) Experience of the manufacturer. (c) The manufacturer's ability to deliver—*on time*—the quantities you need. (d) The best engineering staff and production facilities available. *On those, and many other counts, PERKINS stands out.* As a result, PERKINS precision, custom-cut GEARS have for years been specified by many manufacturers who are known for the high quality of their own products.

Today! Send us your blueprints or drawings—indicating quantity of gears desired, and we'll quote on your requirements promptly.

***PERKINS MAKES:***
***in all materials, metallic and non-metallic:***
***Helical Gears • Bevel Gears • Ratchets***
***Worm Gears • Spiral Gears • Ground Thread Worms***

**PERKINS MACHINE & GEAR CO.**
**SPRINGFIELD 2, MASSACHUSETTS**

## Names in the News

Roy Perkins

**Roy Perkins** has been appointed manager of the blast furnace dept., F. H. Mcraw & Co., New York.

**Ray E. Greenough** has been appointed chief engineer of Cleveland Pneumatic Tool Co. Newly elected vice presidents of the firm are: **Vern R. Drum, John F. Wallace, E. W. Cleveland. Ogden Ashley** has been elected treasurer, **Lloyd R. Shivley**, controller, and **Melvin J. Balser**, assistant controller.

**Frederick S. Bartlett** has been named factory manager of the Bristol, R. I., plant of United States Rubber Co.

A. B. Bolender

**A. B. Bolender** has retired from active duty with the Warner Gear Div. of Borg-Warner Corp., Muncie, Ind., after 39 years with the firm, leaving himself free for a limited number of lectures and consultation on quality and production.

William S. Loose

**William S. Loose,** former director of the laboratory development section of the Magnesium Laboratory, Dow Chemical Co., Midland, Mich., has been appointed Magnesium Div. sales manager.

**F. Kermit Donaldson,** until recently vice president, general manager, and treasurer of The Machined Steel Casting Co., Alliance, Ohio, has been named executive vice president of The Steel Founders Society of America, Cleveland.

**Charles E. Pearson** has been named coordinator of sales, production and engineering of a new speed grip division for Tinnerman Products, Inc., Cleveland.

**Ronald E. Griffiths,** for three years supervisor of the American Steel & Wire Co. research laboratory in Cleveland, has been appointed assistant director of research for the company.

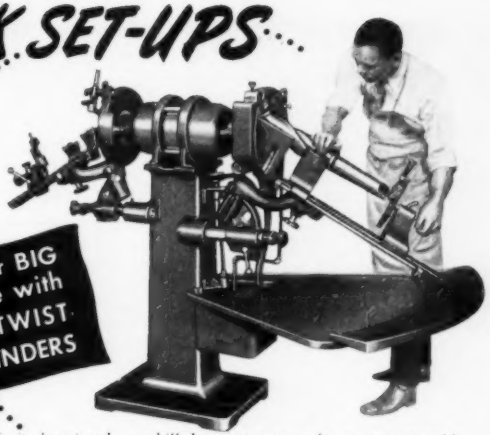
## BUSINESS ITEMS

**Park Drop Forge Co.,** Cleveland, will begin construction of a $100,000 addition to its machine shop, expected to be completed this summer.

**Feedall Machine & Engineering Co.,** Willoughby, Ohio, will expand operations by establishing its own manufacturing shop in a newly-constructed building.

**Wagner Electric Corp.,** St. Louis, has purchased a plant consisting of industrial buildings containing 90,000 sq. ft., located on an eight acre tract at Mt. Vernon, Ill. Transformer tanks will be built there.


QUICK SET-UPS....



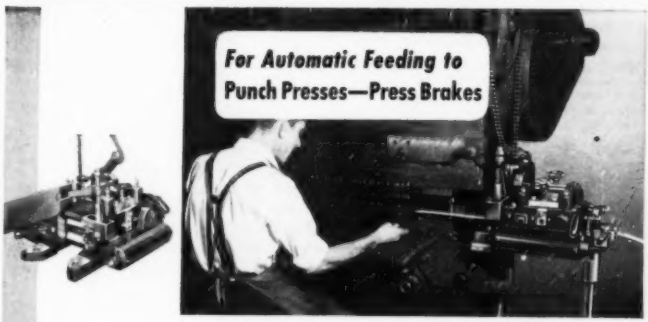
...another BIG advantage with YANKEE TWIST DRILL GRINDERS

With the YANKEE, it doesn't take a skilled operator to make set-ups smoothly, easily and quickly.
Whether drills are large or small . . . long or short . . . straight or taper shank . . . you can change easily from one to another almost without interruption. On the YANKEE, the drill rests in a "V" and regardless of size, always centers itself.
The YANKEE Twist Drill Grinder grinds quickly and accurately . . . uniform pressure control prevents burning. Adaptable also for 3 and 4 lip drills. Drills are ground with lips of equal length producing accurately sized holes. Yes . . . YANKEE-ground drills cut faster, drill straighter, and stay sharp longer. Before you buy . . . investigate the YANKEE!
Send us some of your drills. We will recondition and return them without cost to you. You'll see a real improvement in their performance when you use them.

Write for free illustrated Bulletin A-89.

COVEL MFG. COMPANY
BENTON HARBOR MICHIGAN

Our 75TH Year




A press brake equipped with Wittek No. 6-L Automatic Roll Feed

You Can't Beat WITTEK

Wittek Roll Feeds are made in standard models to meet every requirement in the automatic feeding of strip stock to punch presses or press brakes. The distinguishing feature is their simple and economical method of operation which does away with complicated parts thereby assuring *speed* and *accuracy* in the feeding of various kinds and thicknesses of material.
Wittek Adjustable Reel Stands are designed as companion units to Wittek Automatic Roll Feeds and are available in seven different models to handle *ALL* types of coiled strip stock and wire being fed to punch presses or similar production machinery.
Special units of Wittek Automatic Roll Feeds and Adjustable Reel Stands are engineered to meet unusual requirements.

*Write for complete descriptive literature*

WITTEK Manufacturing Co.
4320 W. 24th Place
Chicago 23, Ill.

Automatic ROLL FEEDS AND REEL STANDS

# CROSS UNIVERSAL GEAR MACHINES

*for*

- ROUNDING
- CHAMFERING
- POINTING
- BURRING

Cross Universal Gear Machines embody advanced engineering developments to obtain highest productivity and assure lowest possible operating costs.

They feature utmost flexibility for handling a wide variety of gears. Continuous cutting motion, exclusive with Cross, speeds production at top efficiency.

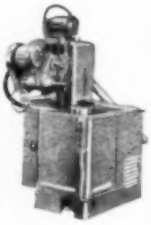
Special skill is not required because machines are automatic and push button controlled. Power clamping is foot pedal controlled. Both hands are free for work handling.

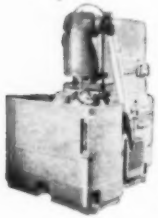
## No. 55

For rounding, pointing, chamfering or burring external and internal:

spur gears
helical gears
clutches
splines

Typical productivity when rounding or pointing 8 pitch 30 tooth gears is 55 net hourly.





## No. 65

For pointing or chamfering external and internal:

clutches
spur gears
bevel gears
splines

Typical productivity when pointing 10 pitch 30 tooth gears is 100 net hourly.

## No. 75

For burring or chamfering both ends at the same time.

helical gears
spiral bevel pinions
hypoid pinions

Typical productivity when chamfering 8 pitch 40 tooth gears is 200 net hourly.

THE CROSS COMPANY
Established 1898

SPECIAL MACHINE TOOLS
MILLING • DRILLING • TAPPING • BORING
TURNING • SHAPING • GRINDING • HONING

DETROIT 7, MICHIGAN


**Lamson & Sessions Co.**, Cleveland, will spend approximately $500,000 in 1949 for improvement and replacement of machine tools and materials handling equipment.

**Cerium Metals Corp.**, New York, has moved general offices to 153 Waverly Place, New York.

**Taylor Dynamometer & Machine Co.**, Milwaukee, is the new company formed following purchase of the Machinery Div. of the Taylor Mfg. Co., Milwaukee, it was announced by A. C. Flamme, formerly sales manager of Taylor Mfg. and C. E. Chavez, consulting engineer.

**Southern Precision Castings**, Charlotte, N. C., a newly incorporated firm headed by V. A. Crainich of Dayton, Ohio, will be established soon in an 8000-sq. ft. plant at 2319 Hutchinson Ave. The firm will engage in the production of brass, bronze, and aluminum precision castings.

## OBITUARIES

**Benjamin F. Waterman**, 69, who was employed by the Brown & Sharpe Mfg. Co., Providence, R. I., for more than 50 years, died at his home in Providence, March 22, after a prolonged illness. He was head of the Mechanical Planning Dept. at the time of his retirement in May, 1947. He served as president of the American Gear Manufacturers' Association from 1930 to 1932, in 1942 being elected to honorary life membership. He was a member of the Providence Engineering Society and the American Society of Mechanical Engineers.

**Fred E. Rundquist**, 63, foundry manager of Greenlee Bros. & Co., Rockford, Ill., died March 21 in Phoenix, Ariz. where he had been recuperating from a heart attack. He was a past president of the American Foundrymen's Association and was a board member of the Foundry Educational Foundation.

**Frank H. Stohr**, 47, general manager of the Norwood (Ohio) works of the Allis-Chalmers Mfg. Co., died in Cincinnati, March 29. He was formerly executive vice president and a director of the Elliott Co., Jeannette, Pa., and was previously with the Westinghouse Electric Corp. as manager of that firm's industrial sales division.


# SCHERR *aids to precision – production*

## WILDER MICRO PROJECTOR

### Magnified precision at low cost

A bench inspection tool that tells the whole truth at a glance. Adapted to constant checking of close-limit production, instantly spotting tool wear or other cause of inaccuracy. Ideal for checking threads and similar work. The Model A Wilder Projector is today saving its cost many times over in hundreds of shops, by preventing rejects. Write for full data and interesting low price.

## WILDER TOOLMAKERS MICROSCOPE

Are you doing government military work? Here is the tool you need to check the new Unified Screw Thread, a combination of British and American standards, now required on all military production. This tool measures two ways with micrometer to .0005", or closer with gage blocks. Gives both shadow and reflected image. At a price any shop can afford.

## Measure gear pitch quickly

### SCHERR GEAR GAGE SET

Any diametrical pitch, from 3 to 64, obtained instantly without counting teeth, measuring gear diameter, or other computation. Used like a thread gage. Teeth are cut in stainless steel segments by Fellows gear generating method, on true arc. Here is something the gear-using world has long needed. Complete set, $12.50 In ordering, specify 14½ deg. or 20 deg. P.A.

*Write for full details on these tools, and for the Scherr Small Tool Catalog.*

GEO. SCHERR CO., Inc.
200-D Lafayette St. New York 12, N. Y.

# FREE LITERATURE

## New Catalogs, Booklets, Bulletins

### MACHINERY AND ATTACHMENTS

**1** CYLINDRICAL GRINDER—*Landis Tool Co., Waynesboro, Pa.* 16-page catalog A-49 presents 4-in. type H plain hydraulic cylindrical grinder with complete descriptions, drawings, and photographs of the machine parts and attachments and with specification tables.

**2** ROLL FEEDS—*Witteh Manufacturing Co., Chicago, Ill.* 24-page bulletin depicts roll feeds for punch presses. Details of feeding mechanisms and methods of attachment to presses are included with price lists and specifications.

**3** SHAPER — *Rockford Machine Tool Co., Rockford, Ill.* 8-page circular No. 300 illustrates 36-in. openside Hy-Draulic shaper equipped with hydraulic feed and drive. A specification list is included with photographs of special features.

**4** SHEET-METAL MACHINERY — *Wysong and Miles Co., Greensboro, N. C.* 20-page catalog gives full descriptions and illustrations on sheet-metal equipment and its uses.

**5** INCLINABLE PRESSES — *Johnson Machine and Press Corp., Elkhart, Ind.* General catalog lists standard-model inclinable punch presses with capacities from 16 to 90 tons. Illustrations, prices and performance data are included.

**6** PUNCH PRESSES — *Sales Service Machine Tool Co., St. Paul, Minn.* 4-page bulletin P348 presents Press-Rite open-back, inclinable presses for precision work.

**7** ENGINE LATHE — *Sidney Machine Tool Co., Sidney, Ohio.* 8-page folder illustrates 16-in. model 32 lathe with an all-herringbone geared headstock. Tailstock, spindle nose and a taper attachment are described.

**8** GEAR SHAPER—*The Fellows Gear Shaper Co., Springfield, Vt.* 7-page circular describes No. 10 rotary gear shaper and presents SAE paper on Torque-Converter transmission which details operation of machine. Specifications are included.

**9** BROACHING MACHINES — *Acme Broach Corp., Milan, Mich.* 4-page bulletin H-48 depicts horizontal hydraulic broaching machines with chart of specifications.

### TOOLS AND ACCESSORIES

**10** FACE MILLS — *O.K. Tool Co., Shelton, Conn.* Catalog 36 lists carbide dual-adjustable face mills, end mills, shell end mills, and new free-cut face mills.

**11** PRODUCTION - CONTROL ACCESSORIES — *Reeves Pulley Co., Columbus, Ohio.* 12-page bulletin describes functions of production control and hydraulic, mechanical and differential automatic controls for constant tension, constant velocity and synchronization.

**12** FIXED GAGES — *Sheffield Corp., Dayton, Ohio.* 116-page catalog presents information on perishable gages, including prices, diagrams, specifications and tables.

**13** MAGNETIC CHUCKS — *Rockford Magnetic Products Co., Rockford, Ill.* 24-page 1949 bulletin, "Magnetic Hobbing Methods," contains information on magnetic holding applied to milling, planing and grinding operations. Power-Grip chucks are cataloged.

**14** PNEUMATIC GRINDERS — *M-B Products, Detroit, Mich.* 24-page folder lists hand and bench grinders, attachments, air-line filters and lubricators.

**15** UNIFIED SCREW THREADS — *Eastern Machine Screw Corp., New Haven, Conn.* 6-page digest of the new thread system presents contours and size limits for two classes of fit. Thread terms are defined and diagrams illustrate clearance ranges.

**16** CARBIDE CHART—*Adamas Carbide Corp., Harrison, N. J.* Comparison chart lists equivalent carbides produced by established manufacturers for steel, cast-iron, and general applications.

**17** JIGS AND FIXTURES — *Sivyer Tool Co., Detroit, Mich.* 150-page catalog lists spring jigs, rack and pinion jigs, clamps, fixture details, and patented fixture racks and includes illustrations of the parts in use.

**18** AIR CLAMPS—*Bellows Co., Akron, Ohio.* 12-page bulletin CL-15 illustrates complete line of pneumatic devices for clamping, holding, and feeding with descriptions of the tools.

### HEAT-TREATING AND WELDING

**19** GAS BURNERS—*Surface Combustion Corp., Toledo, Ohio.* 130-page catalog describes high- and low-pressure equipment for all common gaseous fuel, including 60 types of burners in 600 sizes. An engineering data section on furnace design and heat-requirement calculations is included.

### PLANT SERVICE EQUIPMENT

**20** CONTINUOUS CONVEYOR — *Richards-Wilcox Mfg. Co., Aurora, Ill.* 36-page bulletin presents continuous power conveyors with basic construction information, track layouts, supports, drives, load pendants, and accessories.

### Example

Name John Roderick
Title Supt.
Company W.C. Dow Mfg. Co.
Co. Address 601 North St.
Brooklyn, 7, N.Y.
AMERICAN MACHINIST, New York

Fill in below number of ONE catalog wanted: 32

### How to Order

1. If you are requesting four pieces or less, please use only the bottom card.
2. Be sure to fill one space for each booklet.
3. When you have filled out one card, detach stamp and mail.

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AMERICAN MACHINIST, New York — Not good after July 1, 1949

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# FREE LITERATURE

AMERICAN MACHINIST

330 West 42nd Street

New York 18, N.Y.

Place 3¢ Stamp Here

**21** FLOOR-MAINTENANCE EQUIPMENT—*Brewer Electric Mfg. Co., Chicago, Ill.* 34-page booklet covers all aspects of floor maintenance. Wood, asphalt, tile, concrete, ceramic and marble floors are discussed, and a section recommends techniques in removing many types of dirt and stain from all types of flooring.

**22** BASKETS AND TRAYS — *Stanwood Corp., Chicago, Ill.* 16-page catalog 16 illustrates baskets, trays, fixtures, retorts, carburizing boxes and quenching tanks for materials handling.

**23** STEEL STRAP—*A. J. Gerrard & Co., Melrose Park, Ill.* Steel-strap calculator determines length and weight of steel required for any given binding operation. If length of a strap, strap size and the number of straps required are known, total weight is read on the calculator.

**24** STRADDLE TRUCK—*Hyster Co., Portland, Ore.* 16-page catalog shows revised Model M truck with 18,000-lb capacity and greater visibility. Specifications and photographs are included.

**25** STEEL IDENTIFICATION—*Gorham Tool Co., Detroit, Mich.* 32-page, pocket-size booklet lists classifications and symbols for identification of high-speed steel. Symbols, manufacturers, brand names and recommended uses are included.

## PARTS AND MATERIALS

**26** COUPLING SELECTOR — *Falk Corp., Milwaukee, Wis.* Slide-rule type selector indicates coupling sizes, based on standards for types of driven machines.

**27** CENTRIFUGAL CASTINGS — *Ampco Metal, Inc., Milwaukee, Wis.* Stock list on large card features weights of standard bars listed by od's. Reverse side explains advantages of Ampco metal.

**28** FIXTURES—*Swartz Tool Products Co., Detroit, Mich.* 44-page catalog 941 depicts locks and fixtures for production setups. Drawings, specifications, and illustrations are presented.

**29** BALL JOINTS—*Barco Mfg. Co., Chicago, Ill.* Two 6-page bulletins cover flexible ball joints and swivel joints for extra-heavy duty. Drawings and descriptive material are included.

**30** STAINLESS STEEL — *Eastern Stainless Steel Corp., Baltimore, Md.* 127-page manual is concerned with chrome-nickel, stainless-steel sheets and plates and their applications in many types of industries. Complete data on produced steels is contained, and a section covers details of stainless working and fabricating.

**31** STEEL—*Jessop Steel Co., Washington, Pa.* 16-page booklet describes stainless and heat-resisting steels, tool and die steels, and cast-to-shape steels. Included are analyses and applications.

**32** FASTENERS — *Allmetal Screw Products Co., New York, N. Y.* 90-page catalog covers complete line of stainless-steel fasteners and presents engineering data pertinent to stainless-steel application.

**33** CALCULATOR—*F. J. Littell Machine Co., Chicago, Ill.* Slide-rule-type calculator figures weight of coils of steel.

**34** METALS — *Rodhard Metals Co., Glenside, Pa.* 8-page booklet lists metals for cutting tools, precision castings, high-temperature alloys and for metal forming and finishing.

**35** METAL STAMPINGS — *Quadriga Mfg. Co., Chicago, Ill.* 16-page bulletin illustrates washers, terminals, blanking dies, stampings, and compound dies. Standard gages of iron and steel are tabulated.

**36** SPEED CHANGERS—*Allis Chalmers Mfg. Co., Milwaukee, Wis.* 12-page bulletin discusses Vari-Pitch speed changers and gives data on ranges, selection, inspection and maintenance.

**37** CASTING STEELS—*Empire Steel Castings, Inc., Reading, Pa.* 10-page data sheet present information on 150-cast carbon, alloy, and stainless steels.

**38** DATA SHEETS—*Cero De Pasco Copper Corp., New York, N. Y.* 16 pages of data sheets cover Cerro-alloys, casting procedure, bending methods and applications.

**39** IRON BEARINGS — *Bound Brook Oil-Less Bearing Co., Bound Brook, N. J.* 24-page size list No. 21 covers porous-bronze and sintered-iron bearings which can be made without tooling charge.

**40** BALL BUSHINGS — *Thomson Industries, Inc., Manhasset, N. Y.* 12-page booklet catalogs friction-free, linear-motion bearings with charted engineering data.

**41** SPEED REDUCERS — *Farrel Birmingham Co., Buffalo, N. Y.* 44-page bulletin 449 lists line of speed reducers with tabulated specifications and dimensions.

**42** PERFORATED METALS — *Harrington & King Perforating Co., Chicago, Ill.* 128-page catalog 62 metals perforated with round, square, rectangular, triangular and odd-shaped holes.

**43** GRAY IRONS — *Frank Foundries Corp., Davenport, Iowa.* 32-page 50th anniversary booklet presents applications of gray iron in castings and stock.

**44** HIGH-SPEED STEELS — *Jessop Steel Co., Washington, Pa.* 12-page catalog depicts steels in diagrams, discussions and charts.

## MISCELLANEOUS

**45** CONTRACT WORK—*Connecticut Telephone & Electric Co., Meriden, Conn.* 20-page booklet illustrates company plant and equipment and engineering staff to handle special jobs.

**46** SPECIAL MACHINES — *Service Machine Co., Elizabeth, N. J.* 4-page folder illustrates machine-tool facilities and products.

**47** POSTERS—*National Safety Council, Chicago, Ill.* 72-page bulletin lists safety slogans and cartoons with information on ordering.

AMERICAN MACHINIST

330 West 42nd Street

New York 18, N.Y.

Place 3¢ Stamp Here

# BAUSH designs for economy

**BAUSH 2-WAY HORIZONTAL No. 5 ELECTRIC UNIT TYPE DRILLING MACHINE . . . . . .**

was installed in one of the nation's largest automotive plants. NET RESULT — Production costs dropped, thus placing the manufacturer in a better position to meet competition.

Baush engineers strive unceasingly to increase production and lower costs . . . Toward this end they will be pleased to work with you. Present your production problems to Baush . . . if there's a better way to do the job, Baush will find it without placing you under obligation.

The blueprint illustrates the operations performed on a cylinder block by the Baush machine pictured below. Check the blueprint . . . check the specifications . . . this machine may well be **profitably** used in your production line.

## SPECIFICATIONS

Baush 2-way horizontal #5 electric unit type drilling machine with double holding fixture arranged to accommodate (2) automotive cylinder blocks while performing the following operations at rate of approximately 20 blocks per hour.

**Right hand head**

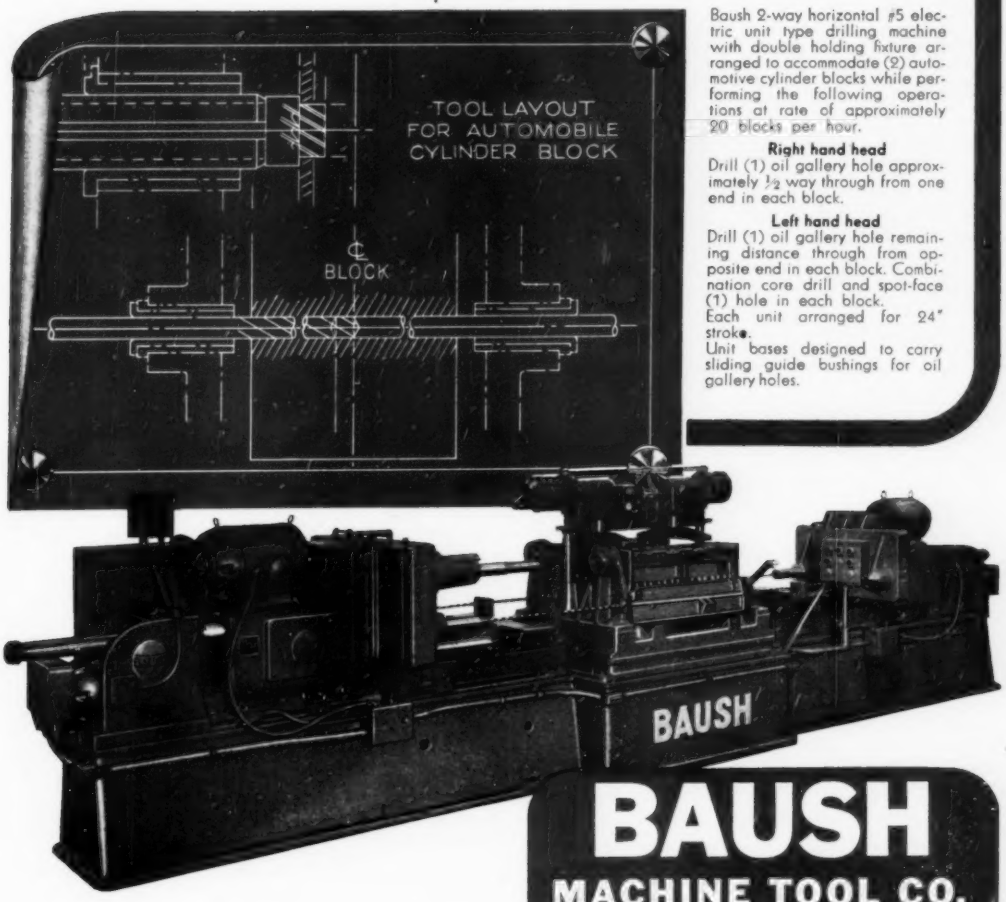
Drill (1) oil gallery hole approximately ½ way through from one end in each block.

**Left hand head**

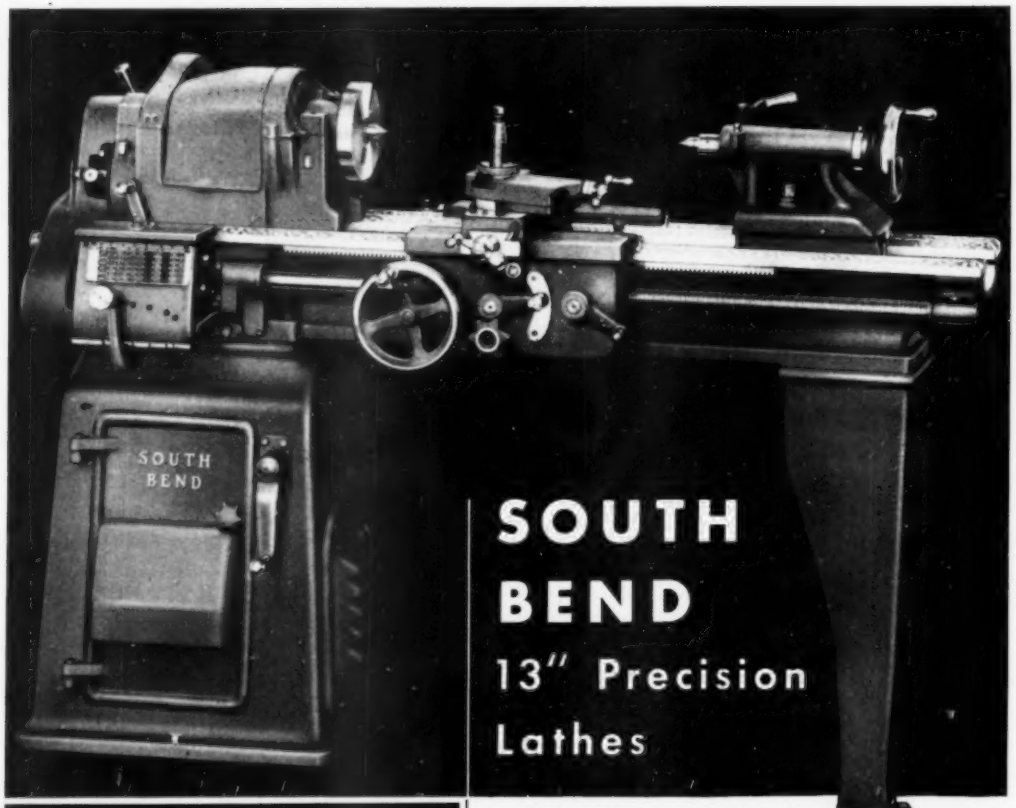
Drill (1) oil gallery hole remaining distance through from opposite end in each block. Combination core drill and spot-face (1) hole in each block.

Each unit arranged for 24" stroke.

Unit bases designed to carry sliding guide bushings for oil gallery holes.




**BAUSH**
**MACHINE TOOL CO.**
**SPRINGFIELD 7, MASSACHUSETTS**




# SOUTH BEND

## 13" Precision Lathes

## NOW – 1" Collet Capacity

**Catalog No. 145-B 13" x 5' Quick Change Gear 1" Collet Lathe with 3 phase, 60 cycle, 220 volt, A.C. motor and drum switch; f. o. b. factory $1332.25**

South Bend 13" Precision Lathes now offer even more advantages where close-tolerance machining is required. They are economical, accurate, fast, and versatile. The new headstock with increased collet capacity permits a greater variety of collet jobs. Substantial savings in capital investment, floor space, and labor cost often result from their installation.

The Quick Change Gear model is popular for production operations, maintenance and service work. The Toolroom model has sufficient capacity for a large variety of toolroom work — its accuracy insures perfect results. Numerous tools and attachments are available for special jobs. Other South Bend Precision Lathes are made with 9", 10", 14½", 16", and 16/24" swings. Also Precision Turret Lathes with ½" and 1" collet capacities, a 14" Drill Press in bench and floor models, and a 7" Bench Shaper. Immediate deliveries can be made. Time Payment Plan is also available.

### SPECIFICATIONS

**SWINGS:** 13-1/8" over bed and saddle wings; 8-3/4" over saddle with chip guard removed.

**BED LENGTHS** . . . . . 4, 5, 6, and 7 feet

**DISTANCE BETWEEN CENTERS** . . . . . 16 to 52 inches

**MAXIMUM COLLET CAPACITY:** 1" (Collets interchangeble with South Bend 10"-1" collet, Series 1000, 14½", 16", 16/24" Lathes)

**SPINDLE BORE** . . . . . 1-3/8 inch

**SPINDLE SPEEDS:** Eight . . . . . 34 to 875 r. p. m.

**POWER LONGITUDINAL FEEDS:** 48 R.H. or L.H., .0015" to .0841"

**POWER CROSS FEEDS:** 48 . . . . . .0006" to .0312"

**THREAD CUTTING:** 48 R.H. or L.H. pitches . 4 to 224 per inch

**CROSS SLIDE TRAVEL** . . . . . 8-1/8 inches

**TAILSTOCK TOP SET-OVER** . . . . . 15/16"

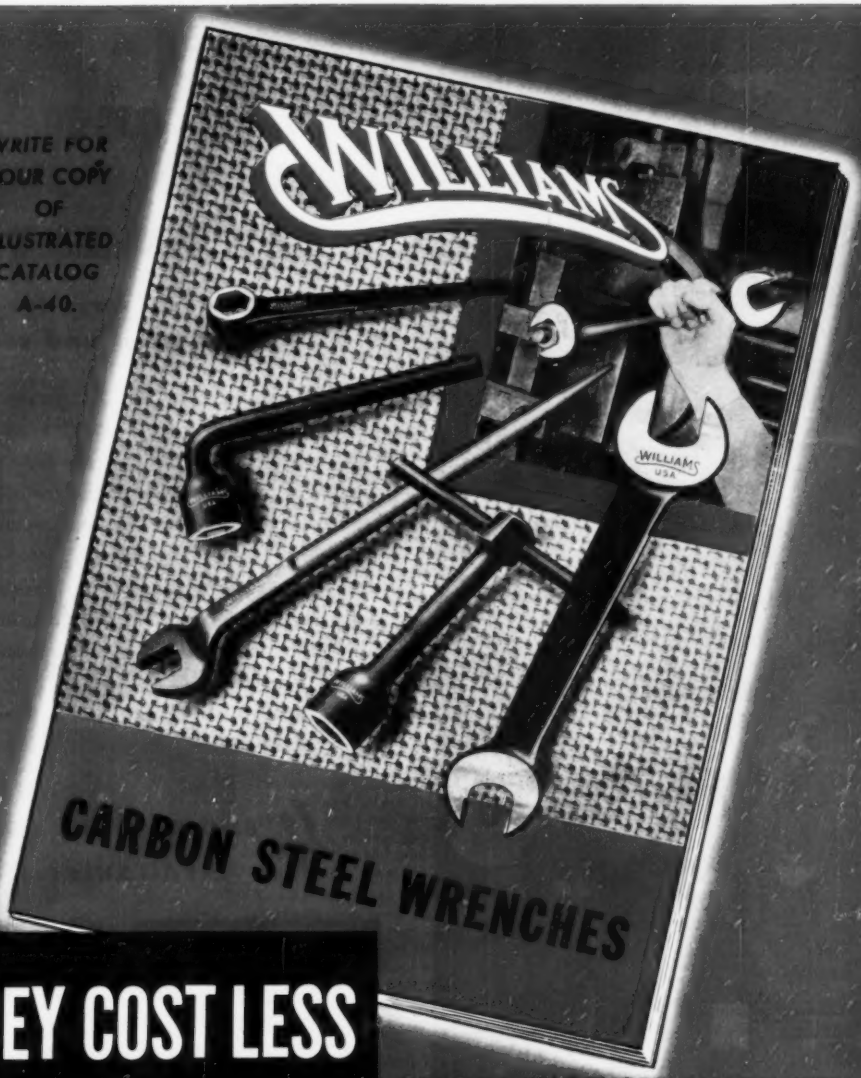
***Write* FOR THIS CATALOG NO. 73**

Describes and illustrates the new South Bend 13" Precision Lathes with 1" maximum collet capacity. Complete specifications and prices are included.

**SOUTH BEND LATHE WORKS**

Building Better Tools Since 1906 • 419 EAST MADISON STREET, SOUTH BEND 22, INDIANA

WRITE FOR YOUR COPY OF ILLUSTRATED CATALOG A-40.




# THEY COST LESS

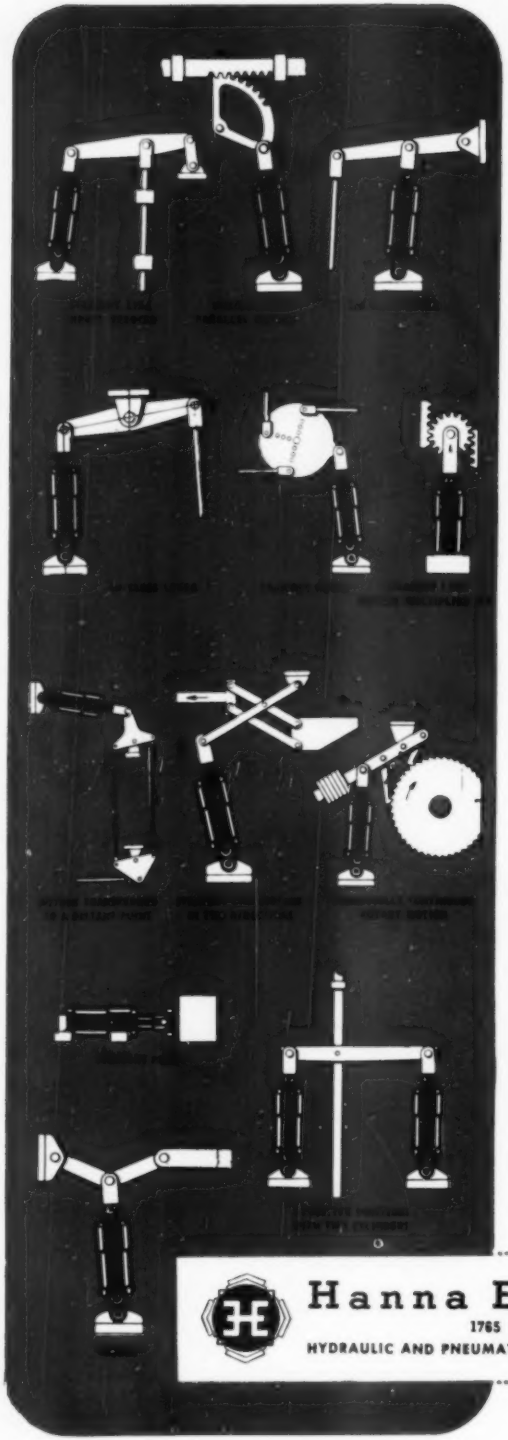
WILLIAMS "SUPERIOR" CARBON STEEL WRENCHES COST LESS THAN ALLOY STEEL WRENCHES . . . PERFORM EQUALLY AS WELL ON MOST INDUSTRIAL APPLICATIONS

WILLIAMS

• OUR DISTRIBUTOR IS YOUR LOCAL WAREHOUSE

OPEN END, BOX, ADJUSTABLE & RATCHET WRENCHES; DETACHABLE SOCKETS & SETS; IMPACT SOCKETS; TOOL HOLDERS; LATHE DOGS; "C" CLAMPS; CHAIN PIPE TONGS & VISES; FLANGE JACKS; PLIERS; SCREWDRIVERS; PUNCHES & CHISELS; SOFT FACED "NUPLAFLEX" TIPPED HAMMERS; HOIST HOOKS; EYE BOLTS; ROD ENDS; CRANK & BALANCE HANDLES, THUMB SCREWS & NUTS.

J. H. WILLIAMS & CO., BUFFALO 7, N. Y. *Distributors Everywhere*



# Hanna
# CYLINDER POWER IS EFFICIENT!

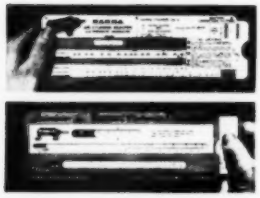
***Use it 1001 ways for machine actuation and control***

The fundamental mechanical movements shown here are just a few of the many ways Hanna Cylinders can work for you — to reduce costs, improve performance, get things done *efficiently*.

Thousands of Hanna Cylinders are employed throughout industry, providing smooth, dependable power in a wide variety of applications. They will push, pull, raise, lower, press, clamp or control for you. They will reduce manual efforts and speed up your production.

To find out how Hanna Cylinder Power can help you, send today for complete information.

## 4 "ENGINEERING AIDS" AVAILABLE...



(1) Hanna Cylinder Selector and Pneumatic Calculator . . . packed with facts and figures on pneumatic power. (2) Hanna Calculator for Hydraulic Cylinders . . . another "slide rule" which shows at a glance, information on hydraulic power and cylinder selection.

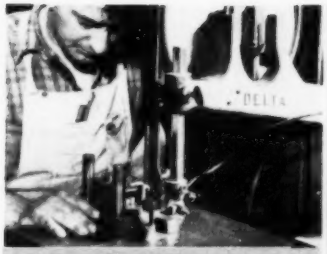
(3) Catalog 233 gives full information on Hanna Hydraulic Cylinders. (4) New Catalog 236 has 24 pages of details on Hanna Low Pressure Cylinders.

*. . . Send for them*

**Hanna Engineering Works**

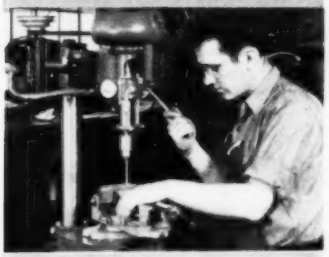
1765 ELSTON AVE., CHICAGO 22, ILLINOIS

HYDRAULIC AND PNEUMATIC EQUIPMENT . . . CYLINDERS . . . VALVES . . . RIVETERS

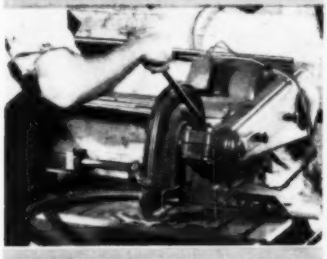


Delta's line of band saws includes Delta 14" Metal-Cutting Band Saw, shown in use here, and the new Delta 20" Band Saw for cutting wood, plastics, and soft metals such as brass, copper, and aluminum.

Delta's line of abrasive finishing machines includes the Delta Abrasive Belt Finishing Machine used above, the Delta Abrasive Disk Finishing Machine, and the new Delta Belt Grinding, Polishing, and Deburring Machine.



Delta's line of drill presses includes 14" and 17" single- and multiple-spindle, bench and floor models, with manual or power feed. Also included are Delta Super-Hi* Drill Presses, for small-hole work from .025" to ¼" diam.



Delta Cut-Off Machines are available in a non-ferrous model and an abrasive model that is also adaptable for cutting wood.

Delta's line of grinders includes this Delta Toolmaker* Surface Grinder, as well as the Delta Toolmaker Chip-Breaker Grinder, Delta Toolmaker Tool and Cutter Grinder, Delta Carbide Tool Grinder, and Delta Grinder with Twin-Lite* Safety Shields.

# Here's how DELTA-MILWAUKEE® Machine Tools help you *maintain volume and quality — with big savings*

There are many ways you can use low-cost Delta-Milwaukee Machine Tools to cut your operating costs, without penalizing output and quality: Here are three . . .

1. You can build high-production, special-purpose machines using standard Delta components—without the delay and heavy capital outlay ordinarily involved in buying inflexible special machines of limited usefulness. Machines using Delta components are readily convertible when change overs are required.
2. You can modernize many obsolete machines, by replacing worn-out assemblies with standard Delta components—thus saving the expense of new machines.
3. You can utilize the portability and compactness of Delta-Milwaukee machines to revise or supplement your present production methods, for more efficient operation.

DELTA MILWAUKEE®

Delta's savings in cost — and in weight and space — are not obtained at the expense of quality. They result from advanced design and from quantity production of standard models.

Take advantage of the many uses of Delta-Milwaukee machines, to cut your investment risk in tools and retain more liquid working capital. Inspect them at your nearby Delta distributor. Ask him about buying on easy time payments.

**DELTA MANUFACTURING DIVISION**
ROCKWELL MANUFACTURING COMPANY
MILWAUKEE 1, WISCONSIN

*Look for the name of your Delta Distributor under "Tools" in the classified section of your telephone directory.*

*Send coupon for catalog A48.*

*Trade Mark Reg. U. S. Pat. Off.

**TEAR OUT COUPON AND MAIL TODAY!**

**DELTA MANUFACTURING DIVISION**
**608D E. Vienna Ave., Milwaukee 1, Wis.**

*Send me free copy of catalog A48.*

Name.....
Title.....
Company.....
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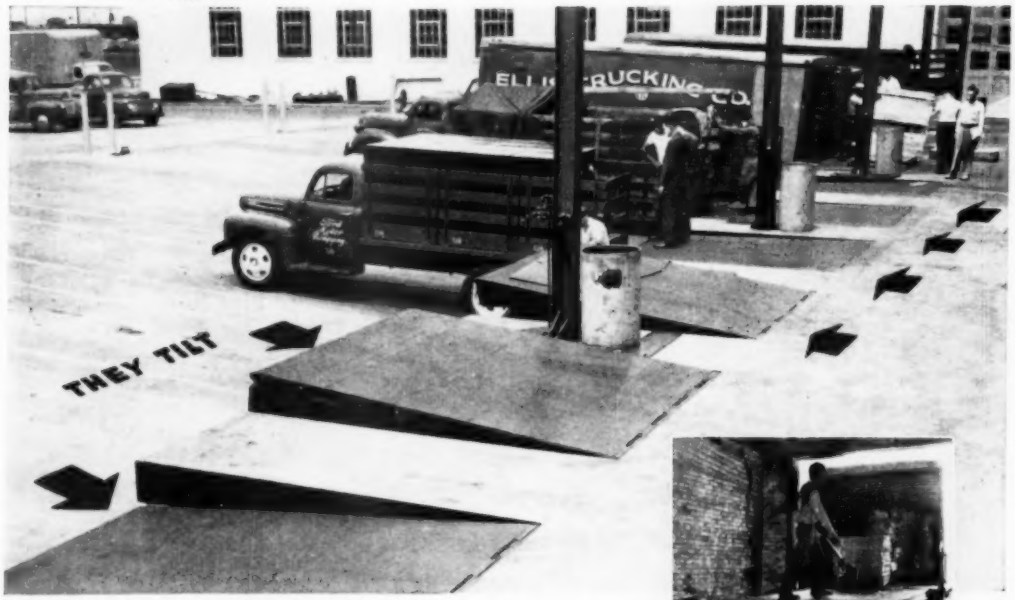
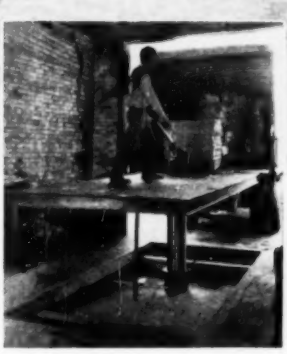
# "LOADING TIME CUT IN HALF"




Tilting Loading Dock Ramps Tilt to Meet Truck Body. Operated by Hydraulic Lifts.



Standard Wayne Platform Lift Itself Becomes Loading Dock.

# *Cut Costs*

## WITH WAYNE LOADING DOCK LIFTS

YOU CAN save time and money with Wayne Hydraulic Leveling Ramps to adjust the level of the loading dock to the truck height. Material on skids can be directly transported into the truck body over a level path. A variance of as much as 20 inches in the height of truck bodies may be instantly adjusted by merely turning a valve. Users say: "Cuts loading time in half." . . "As good as doubling dock facilities."

### SEND FOR ILLUSTRATED FOLDER

Use the coupon below to get all the facts on this new plan to cut costs at the loading dock. No obligation.

**THE WAYNE PUMP COMPANY, FORT WAYNE 4, INDIANA**
**522 Tecumseh Street**

Please send folder on time-saving Wayne Loading Dock Lifts and give us some idea of the cost.

NAME _____

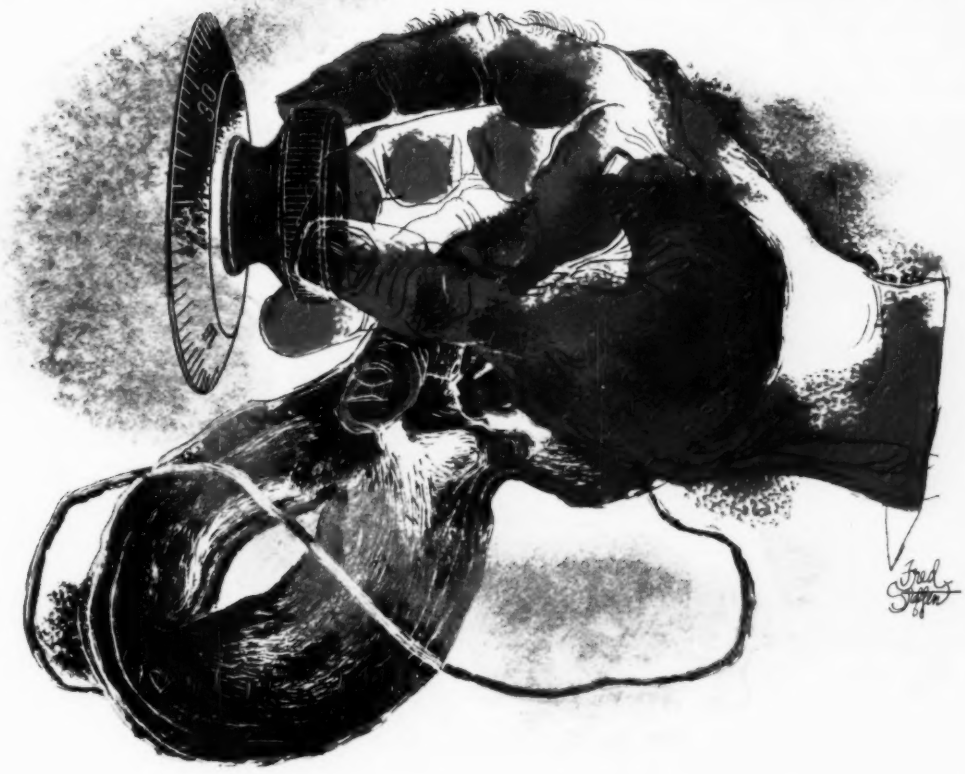
ADDRESS _____

CITY _____ STATE _____

for your protection

**NATIONWIDE SERVICE**

INDUSTRIAL AIR COMPRESSORS • HOSE REELS • BULK PUMPS • POWER WASHERS



# Is this PRODUCTION THIEF at work in your plant?

He works in thousands of plants—choking, stifling and slowing machines, upsetting schedules—costing industry untold sums of money that *can* be saved!

You may not think he's at work in *your* plant, but it will pay you to have a look—the sooner the better.

**For example . . . here are some places to look.**

Are the grease guns in your plant still filled by old-time "paddle" methods—wasting time, wasting grease, risking contamination and dirt? You've caught a suspect!

**You can save 3¾ man hours for every 100 lbs. of grease and eliminate contamination risks.**

Is the "man power cost" of your present lubrication method away out of line? Is it a hit-or-miss method? There's a production thief!

**There is a way to save up to 23.9 man hours in applying each 100 lbs. of grease!**

What about production losses from time-out-for-lubrication? What about repair and replacement costs for the parts that failed? More thievery!

**You can lubricate hundreds of bearings from one central point, with the right grease in the correct amount—while the machine continues to produce!**

Got an idea there may be a "production thief" in *your* plant—in the guise of faulty and costly old-time lubrication methods?

**There's one proven way to stop this loss.**

An Alemite representative can tell you in 10 minutes how Alemite Methods will simplify and better organize your lubrication procedures. He can show you how mechanized lubrication from barrel-to-bearing will increase your production and profits.

Use the phone. Call your Alemite Distributor. Or write to Alemite, 1899 Diversey Parkway, Chicago 14, Illinois.

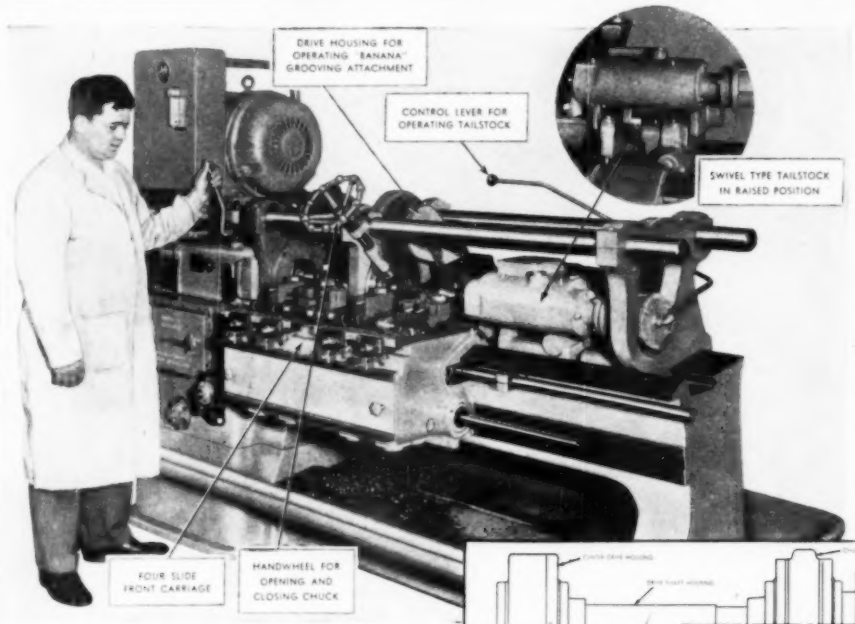
**ALEMITE**

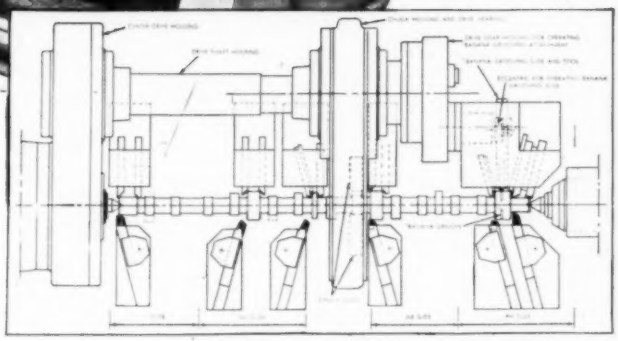
**MODERN LUBRICATION METHODS THAT CUT PRODUCTION COSTS**

STEWART WARNER

# MACHINE OF THE MONTH

PREPARED BY THE SENECA FALLS MACHINE CO. **"THE Lo-swing PEOPLE"** SENECA FALLS, NEW YORK


DRIVE HOUSING FOR OPERATING "BANANA" GROOVING ATTACHMENT
CONTROL LEVER FOR OPERATING TAILSTOCK
SWIVEL TYPE TAILSTOCK IN RAISED POSITION
FOUR SLIDE FRONT CARRIAGE
HANDWHEEL FOR OPENING AND CLOSING CHUCK



## MODEL "LR" CENTER DRIVE AUTOMATIC Lo-swing LATHE TURNS CAM SHAFTS IN SINGLE OPERATION

*Problem:* Turn and chamfer all bearings, oil pump gears and cut interrupted oil or "banana" grooves in a single operation.

*Solution:* The Center Drive Model "LR" Automatic Lo-swing Lathe selected for this job was equipped with a special two-jaw scroll chuck, clamping and driving the shaft from the cam located adjacent to the number three bearing. The chuck jaws are opened and closed with a permanently mounted, gear type, hand wheel shaft. The air operated, swivel type tailstock is operated with two air cylinders, one of which swings the hinged upper section vertically, (see insert) to permit easy loading and unloading in a line parallel with the centers, thus eliminating all overhang of the tailstock center. The second air cylinder controls the movement of the spindle quill. Both movements are controlled by a four-way control valve.

The "banana" grooving attachment is driven and TIMED from the main drive shaft and imparts a shuttle motion to the grooving tool slide, which is mounted, with other squaring tools, in a block on the rear slide. The driving head swivels on the chuck drive housing and follows the "feed in" and "feed out" movement of the rear slide. The "banana" grooves are always cut in definite relation to the chucked cam on the cam shaft.

The machine cycle is as follows: the operator places the cam shaft between centers, closes the chuck jaws and operates the spindle starting lever. The front carriage slides and tools advance in rapid traverse to the cutting position and then slow down for normal feed. The squaring, chamfering and grooving tools, mounted on two automatic back squaring attachments, are timed to cut immediately after the front turning tools have ceased cutting. Immediately the rear tools have ceased cutting, all tools and slides are returned to the starting position in rapid traverse. All movements are automatically controlled; the operator simply loads and unloads the parts and operates the starting lever.

Production per hour at 85% efficiency . . . 80 cam shafts! Bring your turning problems to Seneca Falls.

**SENECA FALLS MACHINE CO., SENECA FALLS, N. Y.**

## PRODUCTION COSTS ARE LOWER WITH Lo-swing

A glance at this 4-page picture presentation may give you an idea or two as to how to PRODUCE BETTER FINISHES and at the same time LOWER YOUR COSTS

✱ P-32T: Pope Direct Motorized Cartridge Type Spindles, for 6" x 18" surface grinders, produce superior finishes, rough off surplus metal fast, run cool and deliver full 1 HP at the wheel.

† P-2500: Pope Heavy Duty Motorized Spindles are for use on surface grinders, planers, boring mills and other machine tools. They come in sizes from ¾ HP to 20 HP and from 900 to 3600 RPM. They are available with flange or tapered nose for quick mounting of wheels or tools.

No. 59

MAIL THIS TODAY

POPE MACHINERY CORPORATION
261 River St., Haverhill, Massachusetts

Gentlemen: Please mail me a copy of your Bulletin S-2, with the understanding that no personal follow-up will be made unless requested.

NAME ..... POSITION .....

COMPANY .....

ADDRESS .....

# Parker-Kalon GROUND THREAD Socket Set Screws are *aces high* with shop men

"You can count on uniform, dependable Class 3 fit with P-K Socket Set Screws."
"True ground finish — none of the imperfections you get with ordinary cut thread set screws."
"Clean starting threads speed assembly work and improve production."
"You don't need to be a skilled mechanic to detect the difference — you can feel it."

## Compare! Write for Samples!

See why P-K Ground Thread Socket Set Screws speed assemblies, improve strength and safety. Thread grinding, once reserved for screws used in the finest precision equipment, now gives Parker-Kalon Socket Set Screws the accurate finish and faultless contour that mean faster assembly and more sales for your products. Write for samples today.

SEND FOR STOCK LIST NOW

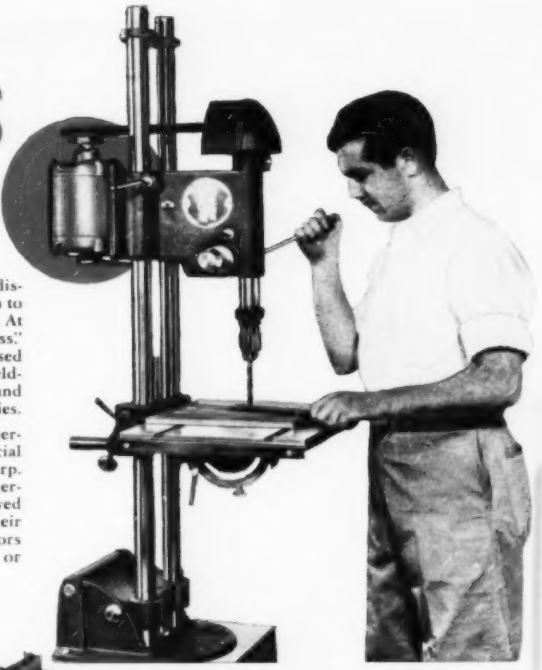
**PARKER-KALON® CORPORATION**
**200 Varick Street**
**New York 14, N. Y.**

AVAILABLE THROUGH ACCREDITED DISTRIBUTORS IN EVERY INDUSTRIAL AREA

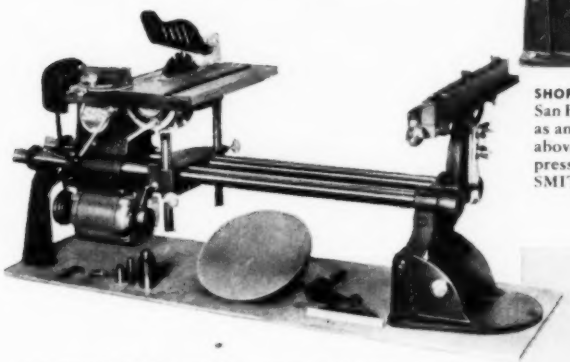
# A.O. Smith Builds
# ELECTRIC MOTORS
## for hundreds of products including the multi-purpose "Shopsmith"

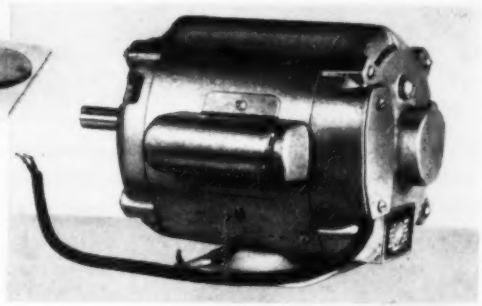
A. O. Smith's research and engineering staff is at your disposal to help integrate motor design with product design to achieve the most efficient and economical operation. At A.O. Smith, research and engineering is itself a "big business." Out of its 75 years' experience have come the first pressed steel automobile frame ever built, the first heavy-coated welding electrode, the first glass-lined water heater tank, and many other new products serving a large number of industries.

Typical of the problems A. O. Smith has solved in engineering electric motors to fit product requirements is the special "Shopsmith" design developed for Magna Engineering Corp. A. O. Smith also extends its complete research and engineering facilities to other manufacturers seeking improved performance or requiring unusual characteristics in their component power equipment. SMITHway Electric Motors can be built either to your particular specifications or furnished in a full range of standard sizes.



**SHOPSMITH**, product of Magna Engineering Corp., San Francisco, is a 5-in-1 shop tool that can be used (left) as an 8" saw, 12" disc sander, 34" lathe, and (as shown above) a 15" vertical drill press and as a horizontal drill press with no limit on work length. Powered with SMITHway Electric Motor.





**SMITHway ELECTRIC MOTOR,** shown here reversed from its mounted position on the "Shopsmith," is a capacitor-start, single-phase, ½ HP motor, 1725 rpm, 115 volts. Double-shielded, prelubricated ball bearings, rolled steel frame, welded steel base for ceiling mount.

### 24-HOUR SERVICE, NATIONWIDE

The A. O. Smith Product Service Division provides fast, low-cost motor service to more than 200 authorized service stations, on a 24-hour, off-the-shelf basis. Factory Service Branches and Warehouses at Union, N.J., Chicago, and Los Angeles.

**Ask the A.O. SMITH man about electric motors for both special and standard uses**

A.O. SMITH CORPORATION 75th ANNIVERSARY 1874 1949

# A. O. SMITH
## Corporation

New York • Boston • Cleveland • Syracuse • Cincinnati • Atlanta • Chicago
Detroit • Minneapolis • Milwaukee • Houston • Tulsa • Dallas • Denver
Seattle • Los Angeles • San Francisco
EXPORT DIVISION: 13 East 40th St., New York 16, N.Y., U.S.A.
Cables: ARLAB N.Y.

## *Another* cost-cutting operation with Osborn Power Driven Brushes...

# *Beauty Treatment* in 9 seconds

**Osborn Power Driven Brushes put smooth, satin finish on Hoover Electric Cleaner parts in just 9 seconds . . . cut unit cost.**

YOU'RE looking at a fast-working 'beauty treatment' performed by Osborn Power Brushes on the metal "skin" of a Hoover Electric Cleaner Extension Tube.

Hoover, a leading manufacturer of fine vacuum cleaners and exponent of the triple-action cleaning principle—it beats...as it sweeps...as it cleans—uses Osborn Power Driven Brushes to produce the smooth, satin finish on extension tubes supplied with its kit of cleaning tools

Powered by a semi-automatic machine, eight Osborn 12" Monitor Wire Brushes revolve at 1725 R.P.M., applying a rich, beautiful lustre to the extruded metal tubing *in just 9 seconds!* One set of brushes satin finish more than 200,000 tubes . . . after which they are used in another department to brush small castings by the off-hand method.

This is just one of hundreds of industrial applications in which longer-lasting Osborn Brushes are lowering production costs. Perhaps Osborn Power Driven Brushes can help *you* to greater savings through more efficient operation. Write—

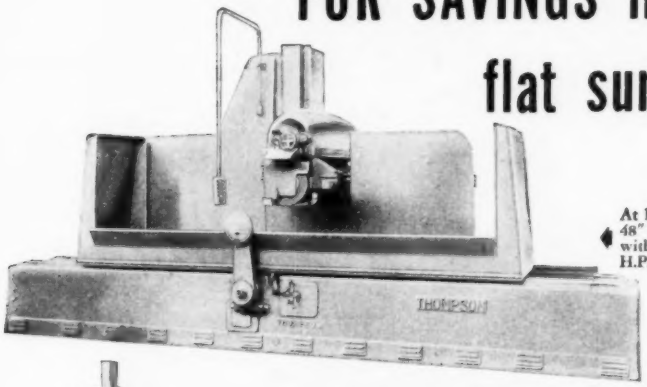
*THE OSBORN MANUFACTURING COMPANY*
*Dept. 125, 5401 Hamilton Avenue* *Cleveland 14, Ohio*

Osborn Brushes

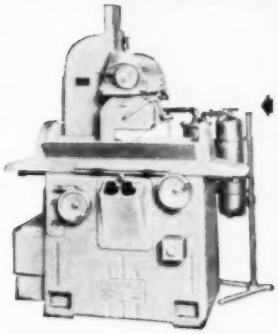
WORLD'S LARGEST MANUFACTURER OF BRUSHES FOR INDUSTRY • POWER DRIVEN BRUSHES • PAINT BRUSHES • MAINTENANCE BRUSHES

# INVESTIGATE

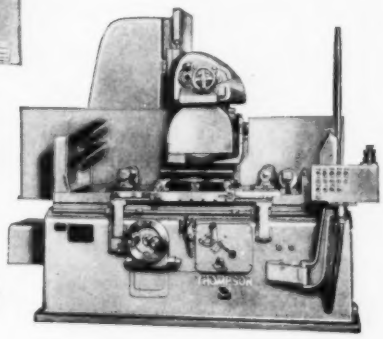
## the complete line of Thompson Machines FOR SAVINGS in grinding every flat surface or contour



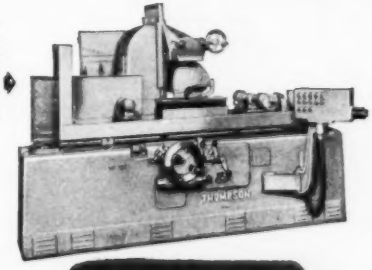
At left—Thompson Heavy Duty Type CX 36" x 48" x 120" Hydraulic Surface Grinder. Equipped with super precision spindle powered with 40 H.P. motor.



At left—Thompson Type "F" 6" x 10" x 18" Hydraulic Surface Grinder. This machine is arranged to utilize a new principle of applying coolant to the grinding wheel. All of the coolant is applied through the grinding wheel making it possible to grind exceedingly thin sections without burning or warping the work.

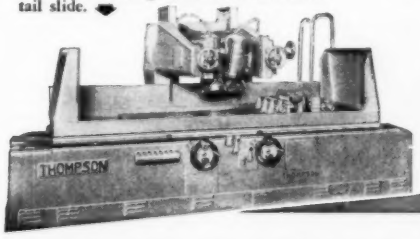


At right—Thompson Type "C" 16" x 16" x 36" Truforming Grinder. The latest design of a Truforming (Crushed Wheel Grinding) machine arranged with Thread Roll Die Grinding Fixture equipped with 20" dia. x 6" face wheel driven by 30 H.P. motor.



At right—Thompson Type "B" 12" x 11" x 36" Truforming Grinder. A new design of a popular Truforming (Crushed Wheel Grinding) machine arranged for production grinding of intricate contours.

Below—Thompson 12" x 11" x 48" Dovetail Way Grinder, designed to eliminate the expensive job of hand scraping machine tool dovetail way bearings. The machine illustrated has capacity for a 12" wide by 48" long male or female dovetail slide.



SEE OUR NEW 32 PAGE CATALOG IN SWEET'S OR WRITE US FOR COPY

**Thompson SURFACE Grinders**

**The Thompson Grinder Co., Springfield, Ohio**

# A Good Beginning for Any Product

When specifications call for "Norma-Hoffmann or equal" the product is off to a flying start for a trouble-free life. Designers know it. That's why they have registered their preference for Norma-Hoffmann on thousands of blueprints in the last thirty-seven years.

NORMA-HOFFMANN BEARINGS CORPORATION, STAMFORD, CONNECTICUT
*Field Offices: New York • Chicago • Detroit • Cleveland*

# BOOST Your "Batting Average"

## IN PRODUCTION AND PRECISION

With Kent-Owens Milling Machines in your production line-up . . . you'll turn out *more work* . . . with *greater accuracy* . . . and *lower costs!*

Shop men like the "feel" of these machines. Designed for rapid, easy set-up and operation. They've "plenty on the ball" in practical features, too! Efficient . . . rugged . . . dependable—assuring steady output without costly down-time.

In the Kent-Owens Standard line are a wide range of hydraulic and hand operated machines. Let a Kent-Owens engineer recommend machines and tooling best suited to your requirements. Write for details. Kent-Owens Machine Co., Toledo, Ohio.

No. 2-20 Milling Machine
Table, 42" x 12"
Table travel, 20"

## Call on KENT-OWENS for Milling Machines

### KENT-OWENS REPRESENTATIVES

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| BOSTON<br>General Machinery Corp. | HOUSTON<br>Oliver H. Van Horn Co., Inc. | MOLINE<br>John J. Nissen Co. | ROCHESTER<br>F. W. Schafer Machinery Co. |
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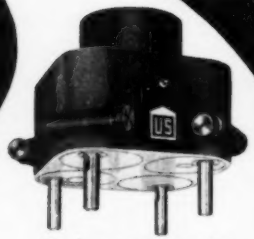
| DETROIT<br>A.C. Haberkorn Mach'y Co. | MINNEAPOLIS<br>The Satterlee Company | PITTSBURGH<br>Barney Machinery Company | WALKERVILLE<br>F. F. Barber Mach'y Company |
| GRAND RAPIDS<br>Joseph Monahan | | | |

# Hard to Please?

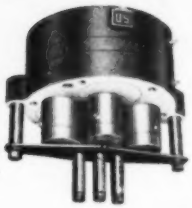
If you're looking for really fine quality heads, available at the lowest possible price, write or wire us today. Whatever your requirements, we can supply you.

*IMMEDIATE DELIVERY!*

We manufacture all types of multiple spindle, fixed center, adjustable and lead screw tapping heads.



*Single eccentric type for equally spaced holes on bolt circles.*



*Double eccentric type for irregular spacing.*

*Universal joint with slip spindle fixed locating plate.*

US HEADS SINCE 1915

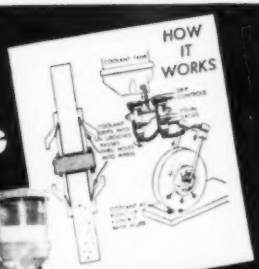
**UNITED STATES DRILL HEAD CO. CINCINNATI 4, OHIO**



# DoAll's COOL GRINDING

Pat. No. 2,461,332

NO SPECIAL WHEELS REQUIRED



DoALL's exclusive *Cool Grinding Unit* on precision surface grinders produces better finish, requires fewer wheel dressings and assures longer wheel life. Keeps the work as cool as any coolant and gives better work visibility. Eliminates the need of coolant pumps and dust collectors for most work. Minimizes cracking, skin softness and warping. Secret of this new process is that coolant passes right through the wheel—fed into wheel near center and drawn to edge by centrifugal force as shown in above drawing. DoALL Precision Surface Grinders—6 models—are hydraulically operated. Write for data.

**The DoALL Co. DES PLAINES, ILL.**



# RIDERMIKROKATOR ...for OUTSIDE MEASUREMENTS

The Ridermikrokator is intended for checking out-of-roundness and diameters of cylindrical parts. As the measurements are carried out according to the three point principle the instrument can be used to good advantage for checking centerless-ground pieces.

They are provided with hardened, ground and lapped anvils and insulating grips. The measuring surfaces of the anvils can be tipped with cemented carbide. Price on application.

This instrument is supplied with removable measuring points with ranges from 3/16" to 4¾".

*Prices and Literature Upon Application*

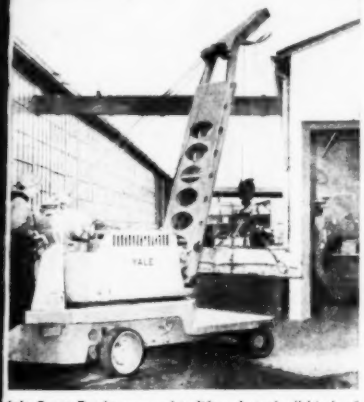
*Setting ridermikrokator by means of a master.*

**SWEDISH GAGE CO. OF AMERICA**
8900 ALPINE AVE. DETROIT 4, MICH.

# Break bottlenecks in production and your

# COSTS TUMBLE

**p goes a pallet load.** High stacking of multi-unit oads puts storage space to fullest use. Yale High Lift ork Trucks handle loads up to 30,000 lbs. in a single peration. High Lift Platform Trucks have capacities p to 50,000 lbs. Low Lift models, to 60,000 lbs.




**'ale Crane Trucks** are used to lift and stack all kinds of oads in plant and yard. They also transport material, speed assembly of machinery and handle many maintenance jobs. They slew and boom easily, travel fast. Capacities up to 10,000 lbs.

Production gets in a jam when material isn't kept "on the move." If you are up against this problem in your plant, it will be well worth your while to learn how modern material handling machinery can open the way to greater output.

Right now you may not know exactly what kind of handling equipment will do the best job and save money at the same time. So your best bet is to get the benefit of the experience of Yale & Towne, pioneer in the manufacture and correct application of material handling machinery.

The Yale line of material handling machinery is so complete and diversified that selection for specific requirements is easy. Whether you need hand or electric hoists, hand lift or power trucks or scales, Yale representatives throughout the nation and the world will gladly help you find ways to break production bottlenecks, save time and effort and cut handling costs.

Take care of the present and plan for the future with Yale Material Handling Machinery. Get in touch with our nearby representative or write direct to headquarters.

TOOLS THAT KEEP INDUSTRY "ON THE MOVE" **YALE**

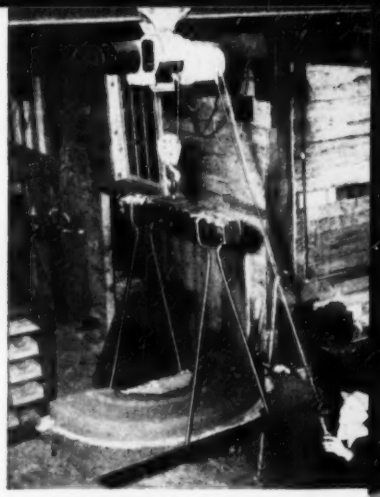
## THE YALE & TOWNE MANUFACTURING CO.

**Department L-4**

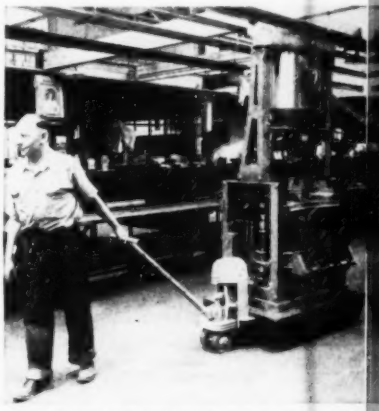
**Roosevelt Boulevard** **Philadelphia 15, Pa.**

**This Worksaver Electric Truck** has a telescopic lift of 10 feet and can handle loads up to 3,000 lbs. The operator steers the truck as he walks. Lift and tilt are hydraulic. Nine other Worksaver models include high and low lift platforms, pallet and tin plate, and a tractor.

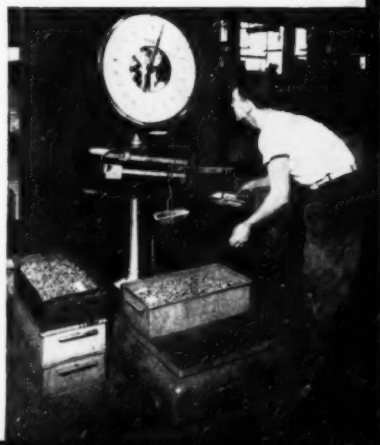
**Yale Load King Scales** provide the unparalleled accuracy of the exclusive MAGNETROL mechanism. They speed weighing, batching, counting, measuring and testing. There's a model for every industrial need—every type from bench to crane scales. Capacities to 60,000 lbs.



**Fragile loads are handled** safely and efficiently by this fast Load King Wire Rope Electric Hoist. Yale makes time and effort saving electric hoists in capacities up to 12 tons. Hand chain hoists are built to lift as much as 40 tons.



**"Easy lift, easy roll, easy steer"** summarizes the qualities of Yale Hand Lift Trucks. Because they can handle so much in a single trip, they help break production bottlenecks. Capacities range up to 20,000 lbs. Platform, pallet and tin plate models.



-YALE-

MATERIAL HANDLING MACHINERY · *hoists . . . hand and electric · trucks . . . hand lift and power · industrial dial scales*

# New MALLORY KO HOLDERS

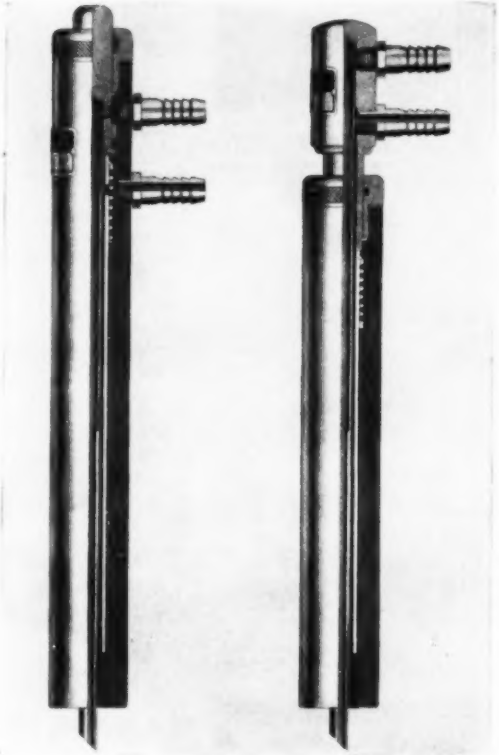
## "K.O." Water Leaks!

Mallory does it again—makes welding history with a new line of leak-proof holders that offer two definite and major improvements:

1. *By using standard size O-Rings in place of ordinary packing, Mallory eliminates the problem of drops of water causing rust or discoloration of the material being processed.*
2. *The complete assembly—including all internal parts—is made of copper alloy, brass or stainless steel! This guarantees full water flow for the life of the unit, keeps the tip ejector mechanism free from any rust or corrosion that could interfere with its easy action.*

And Mallory proves it again before release to the industry. In laboratory tests, the ejector mechanism has been operated over 50,000 times—under water pressures far greater than encountered in normal usage! And KO Holders came through with flying colors!

It will pay you to investigate—*and prove to yourself*—the great advantages of the new Mallory leak-proof KO Holders. Write Mallory today.



*In Canada, made and sold by Johnson, Matthey & Mallory, Ltd., 110 Industry St., Toronto 15, Ontario*

RWMA

**Resistance Welding Tips, Holders, Dies, Rod and Bars, Castings, Forgings**

P. R. MALLORY & CO. Inc.

MALLORY

P. R. MALLORY & CO., Inc., INDIANAPOLIS 6, INDIANA

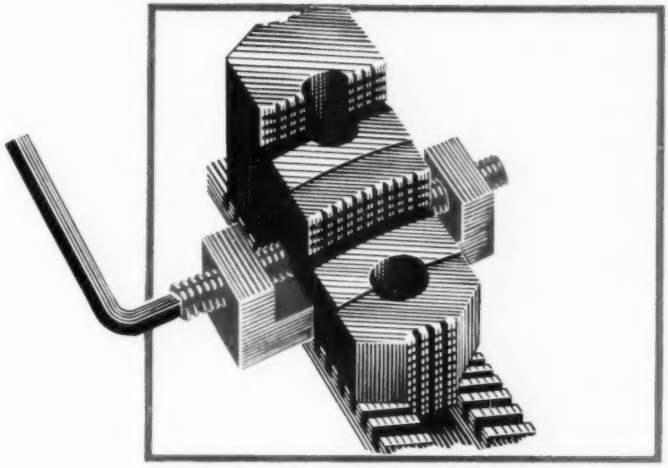
**SERVING INDUSTRY WITH**

Capacitors — Rectifiers
Contacts — Switches
Controls — Vibrators
Power Supplies
Resistance Welding Materials

Predetermined Jaw Pressure . . .

work centering to *precision standards*

# CUSHMAN *Power* CHUCKS



*"Accralock,"* Cushman's exclusive individual jaw adjustment feature for power chucks, provides an extra margin of safety in work holding against heavy cuts, coarse feeds and in high speed carbide tool operations. Adjustment to within .001" concentricity is simple and positive, saving time and effort on every set-up.

Power chucking with Cushman equipment lightens the burden of today's fixed high costs . . . gives you a competitive advantage in greater precision, reduced operator fatigue and increased machine output. Cushman engineers will gladly discuss your particular problems . . . to demonstrate how even the smaller shop can benefit by the use of modern power chucking methods.

THE CUSHMAN CHUCK COMPANY
Hartford 2, Connecticut

*Write for* CATALOG PO63

CUSHMAN also manufactures a complete series of WRENCH OPERATED CHUCKS
Write for Catalog 63 and Bulletins

Consult
CUSHMAN
*Chucking Engineers Since 1862*

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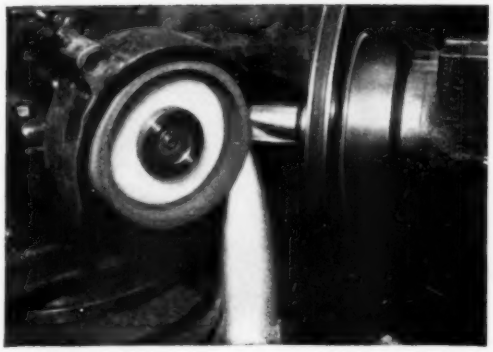
*The Monthly Robertson Bulletin*

# TOOL SALVAGE



PRODUCTION COSTS are in everyone's mind these days. Tool costs, of course, have a very important bearing on production costs, and reconditioning tools can be a big factor in your drive for economy.

Reconditioning tools is not at all difficult if you use a Robertson "Cool-Cut." Because of the open structure of this wheel, the grains remove the metal rapidly . . . yet you obtain a finish equal to that produced by a close-grained, conventional wheel.

Here is one example of the sort of work a "Robertson" does on a tough reconditioning job. A 6" x ¾" high-speed milling cutter was re-cut in 15 minutes. A regular conventional wheel required 40 minutes to do the same job.

Tip and steel of steel-and-carbide reamer blades, inserted-tooth milling cutters and other carbide-tipped tools can be ground in the same operation without glazing the wheel or generating excessive heat. Small reamer blades, for instance, can be successfully ground with .002" down feed and .015" cross feed. Robertson Wheels for this operation range from 7" x ½" to 12" x 1" in size.

For the best results from any grinding operation, make sure your grinding wheels are "Robertsons" . . . the wheels that are precision-built for the toughest jobs. Write for your free copy of the interesting pocket booklet, "How to Buy Production Time."

ROBERTSON MANUFACTURING COMPANY
TRENTON 5, NEW JERSEY

RESIN-BONDED AND VITRIFIED-BONDED GRINDING WHEELS • MOUNTED WHEELS • SEGMENTS

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**You Can Cut Off Tubing With One Finger!**

**ETNA**

*Tube Cutoff Machine*

**THE TUBE REMAINS STATIONARY . . . IT'S THE CUTTER HEAD THAT ROTATES**

The entire cutoff circle—clamping of tube, cutting off and unclamping is completely automatic.

**SINGLE PUSHBUTTON CONTROLLED**

What are you doing about tube cutting?

**THE ETNA MACHINE CO.**

3409 MAPLEWOOD AVE. • TOLEDO 10, OHIO

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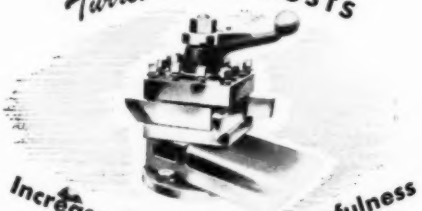
**McCROSKY**
*Turret* TOOL POSTS

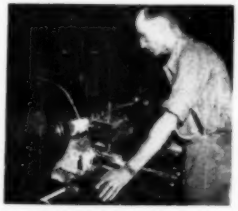


**Increase Engine Lathe Usefulness**

● McCrosky turret type tool posts permit the successive tools needed for multiple operation jobs to be swung into cutting position easily and accurately without stopping the machine.

Furnished in 5 styles for mounting in the T-slot of the compound rest, or the bolt circle of the main slide.

Endorsed by all well known lathe manufacturers.



COST CUTTING TOOLS

**Bulletin No. 17-T** ! Gives full details ! Send for a copy

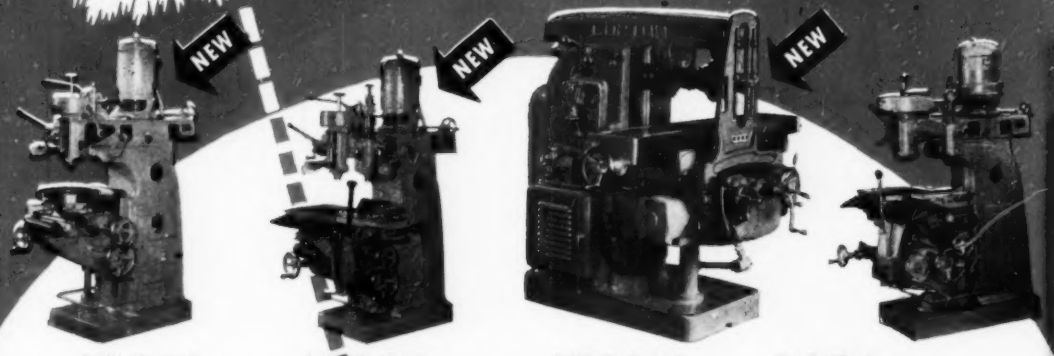
**McCROSKY**
TOOL CORPORATION
MEADVILLE, PA.

*Jack-Lock*® MILLING CUTTERS
*Adjustable* BLADE REAMERS
*Quick-Change* CHUCKS
*Turret* TOOL POSTS
*Block Type* BORING BARS
SPECIAL *Multiple Operation* TOOLS

# *Send* FOR THIS CATALOG

**It will acquaint you with the complete line of GORTON TRACER-CONTROLLED MACHINE TOOLS and Accessories**

Send for your copy today. Gorton tracer-controlled milling embodies distinct advantages on the production line and in the tool room. In many cases, special tooling will make a given operation entirely automatic. Send for the Gorton Condensed Catalog illustrated above or for any of the other specialized bulletins described below — they were published for your information and reference.



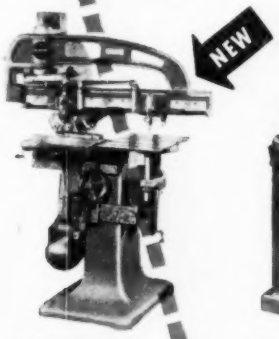

**0-16A Vertical**
A new and improved development in a small size, sensitive vertical mill and router. Incorporates all of the desirable features of former 8-D. Also available with swivel or universal head. Request Bulletin 2240.

**0-16 Duplicator**
A new and better small size tracer controlled duplicator which embodies all of the advantages of the former 8-D. Rugged, versatile and extra sensitive for exacting die and mold work. Also available with swivel or universal head. Request Bulletin 1319.

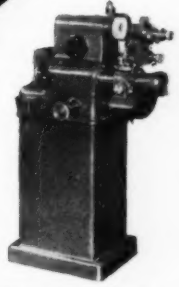
**2-28B Horizontal**
A new contribution to production milling. No. 2 size, fullwidth plain type mill with 10 H.P. spindle drive and speeds up to 2,000 r.p.m. Built for maximum rigidity and a work horse load. Request Bulletin 2321.

**9-J Duplicator**
One of the most popular and practical die and mold duplicators ever built. Rugged in construction; has *Gorton super-speed spindle and sensitive controls for the most exacting work. Request Bulletin 1319.

**3-U Pantograph**
The most used 2-dimensional pantograph in the metal-working field. Sturdy and rigid with sensitive tracer control. Larger and heavier 3-Z model also available. Request Bulletin 1580.




**P13 Pantograph**
The Gorton †Ratiobar Pantograph for 3-dimensional work offers the first basic design improvement in pantograph construction. Simpler to operate, more rigid, and accurate for small dies, molds and hobs. Easily converted for 2-dimensional work. Request Bulletin 2310.



**375-2 Cutter Grinder**
Universal type bench or floor models; capacity up to ⅜" dia., including ball nose and multi-flute cutters of almost any diameter, taper, shape or clearance. For carbide cutters, diamond wheels are used. Choice of tool heads and attachments. Request Bulletin 1317.

**16-B Automatic Lathe**
For precision turning of long slender parts from .005" dia., by 1/32" long to 7/16" dia., by 2¾" long. This Gorton Swiss-type Automatic solves many precision turning problems. Request Bulletin 1800.

*Trade Mark Reg. U. S. Pat. Office

†Pats. Applied For

GEORGE GORTON MACHINE CO.

1504 Racine Street, Racine, Wisconsin, U. S. A.

*Please Send at Once*

For brief facts about the Gorton line of tracer-controlled machines, use coupon or company letterhead and request Bulletin 1655 illustrated above. For specific information on certain machines, see text accompanying each illustration.

Name.....

Title.....

Address..... State...

# Vitrified Wheels

VITRIFIED

. . . for

## intricate precision grinding or coarse heavy work

Inasmuch as Vitrified manufactures a complete line of Grinding Wheels in numerous grades, grain combinations and bondings, it is merely a matter of selecting the right wheel for the work to be handled.

Because of this wide selection, a Vitrified Wheel can be depended on for economy, speed and long life in the specific service for which it is intended.

Whether your work involves roughing, finishing, surfacing, edging, or cleaning, hand, automatic or swing grinding, there is a Vitrified Wheel which will give you maximum service at minimum cost.

Why not call in a Vitrified representative to show you how you can make worthwhile saving in your grinding operations?

**VITRIFIED WHEEL CO., WESTFIELD, MASS.**

# ABRASIVE
## SURFACE GRINDERS
### EXCLUSIVE AGENTS

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1725-1731 First Ave.

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First National Bank Bldg.

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Motch & Merryweather Machy. Co.
715 Penton Building

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Tidewater Supply Co.

**DAYTON, OHIO**
Motch & Merryweather Machy. Co.
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Cheney, C. H. & W. H. Moreton
5735 Cass Ave.

**INDIANAPOLIS 4, I.**
Marshall & Huschart Machy. Co. of Ind.
Chamber of Commerce Building

**KANSAS CITY, MO.**
Blackman & Nuetzel Machy. Co.

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Murrian, The W. S. Co.
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**NEW YORK CITY 17.**
Rudel Machinery Co., Inc.
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427-30 Sunderland Bldg.

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Swind Machinery Co.
Broad St. Station Bldg.

**PITTSBURGH 22, PA.**
Motch & Merryweather Machy. Co.
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Keller, George Machy. Co.
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Jenison Machinery Co.
20th & Tennessee Sts.

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Hallidie Machinery Co.
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**ST. LOUIS 8, MO.**
Blackman & Nuetzel Machy. Co.
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*For ANY Size Machine*

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NOW! REDUCED IN PRICE

A Boring Head That Won't Face Is NOT Complete!

*Accuracy -- Stamina*

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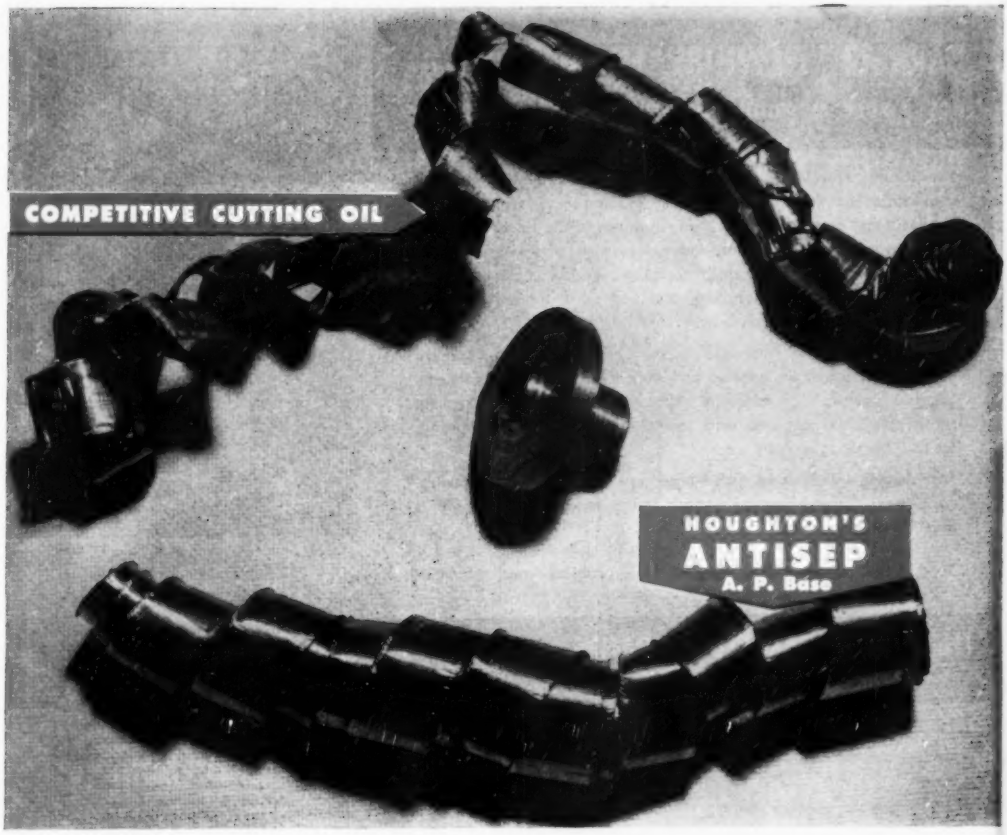



# THE *chips* TELL ANTISEP'S STORY

One look at the two samples of machined chips pictured above, and you will see why Antisep All-Purpose Base was chosen for use in many machines, including automatic screw machines.

This comparative machining of SAE 1045 steel was done on the same automatic, the only variable being the cutting fluid itself and the increased speed Antisep permitted. Examine the chips, then read the facts at the right, and you will understand why this particular plant — and so many others — have standardized on Antisep All-Purpose Base.

It's miscible with either water or oil; high in saponifiable and sulphur; can be used for 90% of your cutting or drawing needs; costs only about 7c a gallon as diluted. For more facts, write for illustrated leaflet, or better yet, tell us you want to try Antisep A. P. Base on a comparative basis, in your own shop.

**HERE'S DETAILED PROOF**

| | *Former Coolant* | *Antisep A. P. Base* |
|---|---|---|
| Dilution | 1:10 | 1:30 |
| Speed | 200 RPM* | 300 RPM |
| Feed | 120 FPM | 180 FPM |
| Time per piece | 60 sec. | 37 sec. |

* *Above this speed, machine chattered—but not with Antisep.*

**E. F. HOUGHTON & CO.**
303 W. Lehigh Ave., Phila. 33, Pa.
*Service and Sales in all principal cities*

## BARRETT "FILWHIRL" ENAMELERS make easy work of many difficult coating problems

The Barrett "Filwhirl" is a Centrifugal Enameler providing a clean, sure and economical way of applying finishing materials to parts or products that can be rotated in fair balance in the revolving bowl. It wastes no coating material, and reduces time and expense when compared with other methods of applying a good commercial finish. It is designed for bulk handling, and can be depended upon for speedy production requirements.

It has proven highly successful in the coating of helical springs, clips, clasps, zipper parts, bead and link chain, toys, automobile and luggage hardware, misc. metal stampings, castings, etc. Excellent results are also obtained with japan, lacquers, varnishes, paints, waxes. No drips or fatty edges.

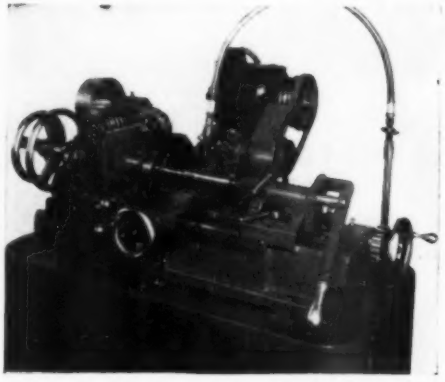
Furnished in spindle post, fixed bowl, and carrier types, in several capacities. Safety features included and auxiliary equipment is available.

*Send a few representative samples to be processed and submitted for your examination.*

*The Barrett Centrifugal Enameler.*

**THE LEON J. BARRETT COMPANY,** 1800 Grafton Road, **WORCESTER, MASS.**

*Designers and Builders of Centrifugal Machinery*



## WALTHAM THREAD MILLING MACHINES

***. . . for producing accurate, fine-finish threads on small diameters at low cost***

This NEW model is mounted on a welded steel base in which are accessibly located control panel, coolant motor and pump. It is equipped with separate motors for cutter, work and coolant. Motor push buttons are conveniently placed.

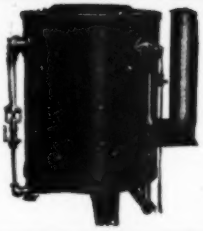
Swing over carriage is 3" and work 2" diameter or smaller can be handled. Threads 8¾" long can be cut with work held on centers.

Special attachments are available for extending the utility of this machine. *Illustrated literature available on request.*

**WALTHAM MACHINE WORKS**
**HIGH STREET WALTHAM, MASS.**

CHECK shipping room savings possible with Marsh Stencil Machines, Brushes, Inks! Electric and Hand Operated machines cut ½", ¾", 1" letters. For sample stencil, Shippers' Handbook, prices, pin this to business letterhead with your name.
MARSH STENCIL MACHINE CO.
MARSH
STENCIL MARKING

## BUZZER *Gas Fired* POT FURNACES



**UP TO 1650° F. QUICKLY ATTAINABLE. NO BLOWER OR POWER NECESSARY . . . JUST CONNECT TO YOUR GAS SUPPLY.**

Atmospheric Pot Hardening Furnace, tangentially fired, assures quick, even heat. Many models available — write for "BUZZER" catalog showing Gas Furnaces, Burners, and other equipment.

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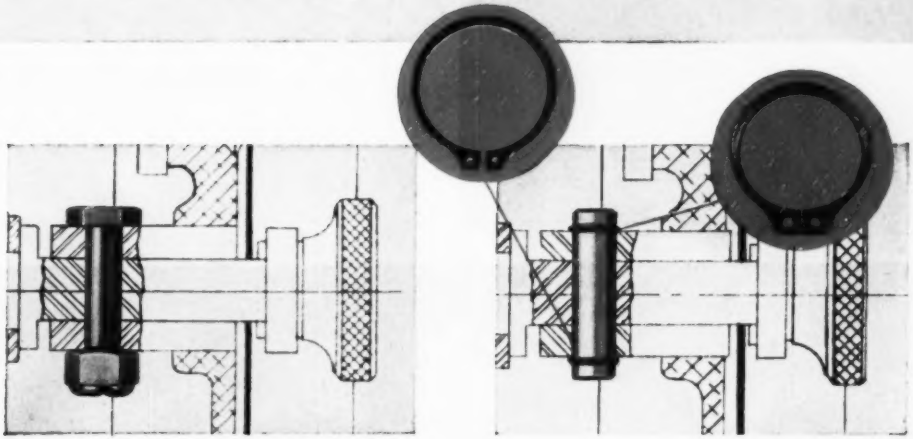
**121 So. Grand Ave. Baldwin, L. I., N. Y.**

# Truarc saves 5 minutes, 9 cents in materials per unit without re-design of electric sanders



**OLD WAY**

*Special ¼" cap screw and ¼-28 fibre-insert nut holds idler arm and pulley assembly on Model A3 "Take-About" Sander, Porter-Cable Machine Company.*

**NEW WAY**

*Simple ¼" C.R. shaft, grooved in automatic screw machine, equipped with Waldes Truarc Retaining Rings. Bowed external ring (#5101-25) at top exerts resilient pressure taken up by Standard external ring (#5100-25) at bottom. Assembly is secure against vibration, can be easily taken apart and re-installed many times with same Truarc rings.*

Every sander through the production lines costs 9 cents less for materials, requires 5 minutes less labor —with just the simple change from cap screw and nut to Waldes Truarc rings by Porter-Cable Machine Company, Syracuse, New York. The change to Truarc required no new design, no alterations in castings, but just the reappraisal of old methods.

Truarc can help you cut costs and increase production, too. Wherever you use machined shoulders, nuts, bolts, snap rings, cotter pins—there's a Truarc ring that does a better job of holding parts together. All Waldes Truarc Retaining Rings are precision engineered, remain always circular to give a never-failing grip.

Send us your drawings. Waldes Truarc engineers will be glad to show how Truarc can help you.

**WALDES**

**TRUARC**

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**RETAINING RINGS**

WALDES KOHINOOR, INC., LONG ISLAND CITY 1, NEW YORK

WALDES TRUARC RETAINING RINGS ARE PROTECTED BY U. S. PATS. 2,302,948; 2,026,454; 2,416,852 AND OTHER PATS. PEND.

Waldes Kohinoor, Inc., 47-10 Austel Place AM-4
Long Island City 1, N. Y.

Please send 28-page Data Book on Waldes Truarc Retaining Rings.

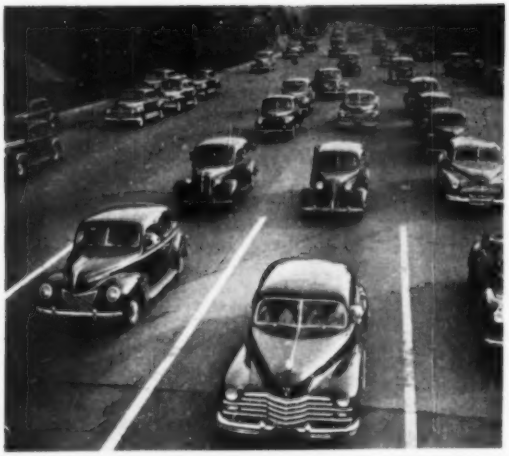
Name_____

Title_____

Company_____

Business Address_____

City_____ Zone____ State_____ ★



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**...comes from a..**

**and for what it takes to make it Metalworking**

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Metalworking produced, and Americans bought, over 5,200,000 cars and trucks in 1948. As many, or more, will be built and sold in 1949. And for you who sell to Metalworking, it's important to remember that automobiles are *just one* of the thousands of basic products built by the eleven divisions of America's biggest industry.

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## *with the Merz "Vigilant" New-Matic

Here, *now*, is the one and only air-activated unit—totally unaffected by surface variations—with magnifications as high as electronic gages. It's the Merz "Vigilant" *New-Matic* Measuring Machine, with magnification up to 10,000 to 1, with a range of .0003. Also available with magnification of 5,000 to 1, with a range of .0006. Gives you the highest precision available—for the price of an air gage. Operates on the proved Merz principle of "balanced air." Has the additional advantage of a new adjustment that determines, independently, spread as well as zero positioning. Furnished with Merz' exclusive Sapphire or Diamond button spindle. Conventional jet-type spindle optional. Ask for a demonstration—in your own plant!

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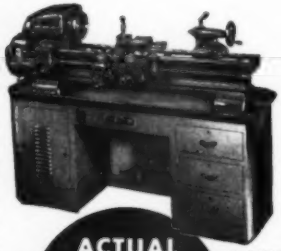
SHELDON L-44 10½" Swing

ACTUAL SIZE OF HOLE THRU SPINDLE

ADD A
SHELDON
*for Profit*



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Increase your profit on ordinary lathe work (diameters to 12") by using smaller, faster, handier and extremely accurate SHELDON Precision Lathes. Eliminate excessive tool investment, excessive power consumption. Save floor space. Save your large equipment for really big work.

The SHELDON Lathe, with "Zero Precision" Taper Roller bearings will work to the closest tolerances, will operate efficiently at full capacity and hold its extreme accuracy long after it has paid off its moderate cost.

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**Wonderful cleaner for brass . . . Results have been excellent . . . Not a single reject on brass and copper work in two months . . . Good cleaning combination . . . All parts plate perfectly . . . Worth its weight in gold . . . No discernible tarnish during anodic cleaning . . . Rejects at lowest point ever . . . Nickel plate extremely adherent, very bright and lustrous . . . Getting excellent results in automatic plating machine . . . 15 to 20 seconds reverse did perfect job . . . Much brighter plating, much better adhesion . . . Could not detect any tarnish . . .**

**FREE** Write today to Oakite Products, Inc., 24 Thames St., New York 6, N. Y., for full information.

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**INDUSTRIAL CLEANING MATERIALS • METHODS • SERVICE**

*Technical Service Representatives Located in Principal Cities of United States and Canada*

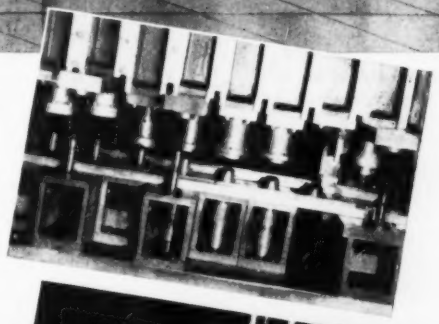
*Can you match these production figures?*

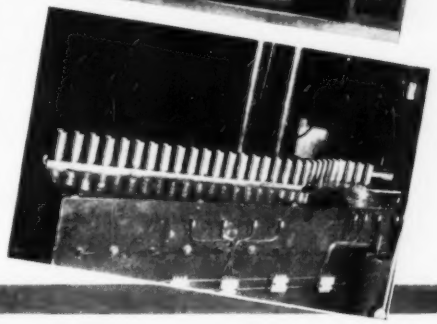
# THIS TRADE Verson MARK TRANSMAT PRESS

**replaces 7 presses... frees 12 men for other jobs... automatically produces over 1000 coil containers per hour!**

Verson TRANSMAT Presses open a whole new concept of metal forming — completely automatic production. The press illustrated and the accompanying close-ups indicate what can be done. .015" strip is fed from a coil, blanked and deep drawn into ignition coil containers — 2.1" in diameter and 4-47/64" deep. Seven operations are performed without intermediate handling, annealing or pickling. Completed units are discharged at the rate of 1000 per hour.

Consider what this can mean to you in the mass production of your product and write today for additional information.





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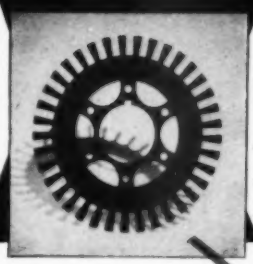
PRESS BRAKES · DIES · DIE CUSHIONS

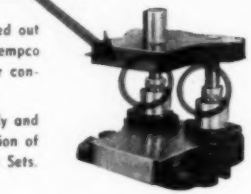
**DIE MAKER SAVED 40 HOURS on the die job for this part**



**CUSTOMER GAINED 375,000 ADDITIONAL PIECES**

Armature lamination of silicon steel was punched out in a single crack in a hand fed press. Lempco equipped dies yielded 375,000 extra pieces over conventional die sets.

Die maker also saved forty hours in die assembly and tryout over previous record due wholly to precision of pre-loaded ball bearing bushing of Lempco Die Sets.



*DIE MAKER Saves Time in Assembly*

*PRESS OPERATOR Gets More Pieces Per Grind*

*by Using* **LEMPCO Anti-Friction Die Sets**

*Here are some comments by users who have standardized on Lempco.*

"... clearances of .001" or under demand Lempco die sets as few *standard* die sets will provide that precision without die maker and press operator risking time losses in aligning punches and press stoppages."

"... press capacity that exceeds 200 strokes a minute requires Lempco die sets as only specially finished pins and bushings can be used with assurance at higher speeds.

"... if die overhang is large, accurate closing at extremities is always questionable unless a pre loaded bearing bushing is used."

"... costly dies and particularly carbide dies require the protection provided by the precision fit of Lempco die sets."

*A new brochure "Factors in Specifying Die Sets" is in production. Write for your copy. Address: LEMPCO, 5500 Dunham Road, Bedford, Ohio.*

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**ANTI-FRICTION DIE SETS**

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***On Press Standards***

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## when enlarging holes with . . .

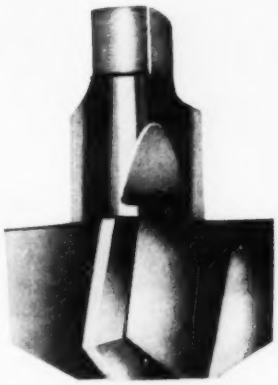
S-J SCULLY-JONES *New*

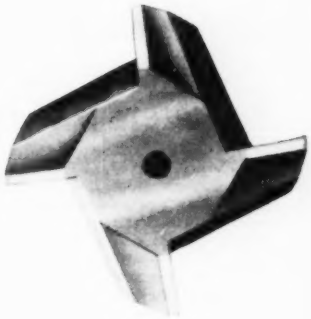
# CORE DRILL CUTTER

**100% more feed** because four flutes are cutting instead of two. Also, this New Cutter removes approximately 45% of its diameter. Result— less time per operation.

**Cut tooling costs** on set-ups for enlarging holes, where guide bushings are not used. Only 4 Drivers are required for the 25 S-J Core Drill Cutters.

**Rigidity is assured** by the short body of the Driver. This eliminates one of the causes of chatter.





**Use these S-J four-fluted Core Drill Cutters and Drivers in**

- radial drills
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- turret lathes
- boring mills
- and similar machines

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Mac-it ⅛" x 2½" Hollow Set Screws have grip of more than 17,000 pounds.

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Hollow Lock Screws
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it's easier with Abbott
*the all round ball*

Theatre seats, ironers, electric mixers . . . all end uses of Abbott Bearing Balls. A complete list of Abbott applications looks like the products of the who's who in American manufacture. Abbott's well rounded line is designed to furnish bearing balls to fit the requirements of almost any product in use today. See if the chart below can't help the efficiency of your production.

A-B CHART

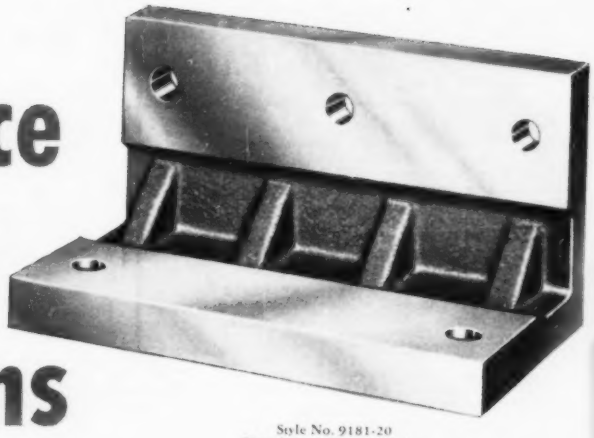
| GRADE | SIZES | Size Tolerances | Sphericity Within |
|---|---|---|---|
| Abbott A | 1/16 — 5" | ± .0001" | .0001" |
| Abbott B | 1/16 — 3" | ± .0002 | .0002 |
| Abbott C | 1/16 — 3" | ± .0005 | .0005 |
| Abbott Hardware | 1/16 — 3" | ± .001 | .001 |
| Abbott Industrial | 1/8 — 3" | ± .002 | |
| Abbott Special | 1/8 — 3 31/32" | ± .003 | |
| | 11/32 — 3" | ± .005 | |

ABBOTT

THE ABBOTT BALL COMPANY
HARTFORD 10, CONN.

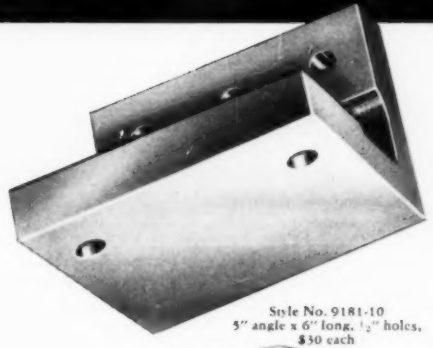
*P.S.*
*The round hole in the square peg can help you with your burnishing problems, too. Ask for a sample kit.*

# New Taft-Peirce Duplex Angle Irons

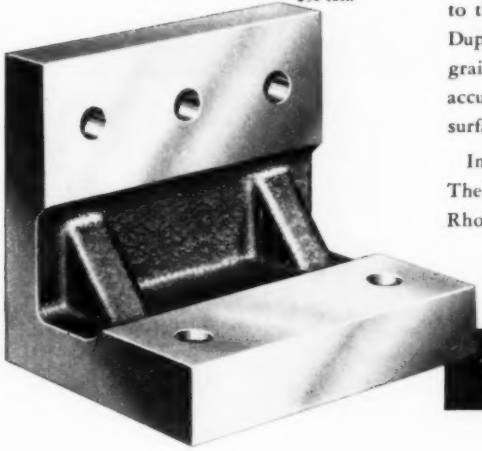


Style No. 9181-20
6" angle x 12" long, $\frac{3}{4}$" holes,
$60 each

## mean faster, more accurate set-ups



Style No. 9181-10
5" angle x 6" long, $\frac{1}{2}$" holes,
$30 each



Here's a new tool that will find constant use on planers, boring mills, shapers and drill presses — a tool that will materially increase accuracy and speed set-ups. The inner finish pads are ideal for clamping work in position to avoid strain and tipping when drilling. Frequently table clamping is completely eliminated.

Outer working surfaces of these angles are ground square to within .0005" in 6"; inner pads are parallel to their respective sides within .0005". Taft-Peirce Duplex Angle Irons are made of fine quality, close-grained cast iron and are properly seasoned to retain accuracy. Prices on request for hand-scraped working surfaces and for special sizes to your specifications.

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*How to*

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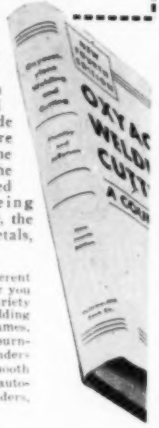

BEGINNING with a discussion of welding and cutting equipment, this book takes you in progressive steps from simple welding techniques to advanced changes and refinements that have been made in the use of the oxyacetylene flame. You're shown the best methods and practices in flame cutting, bronze welding and brazing, and the welding of various alloys . . . and specialized techniques now being used in pipe welding, the welding of light metals, etc.

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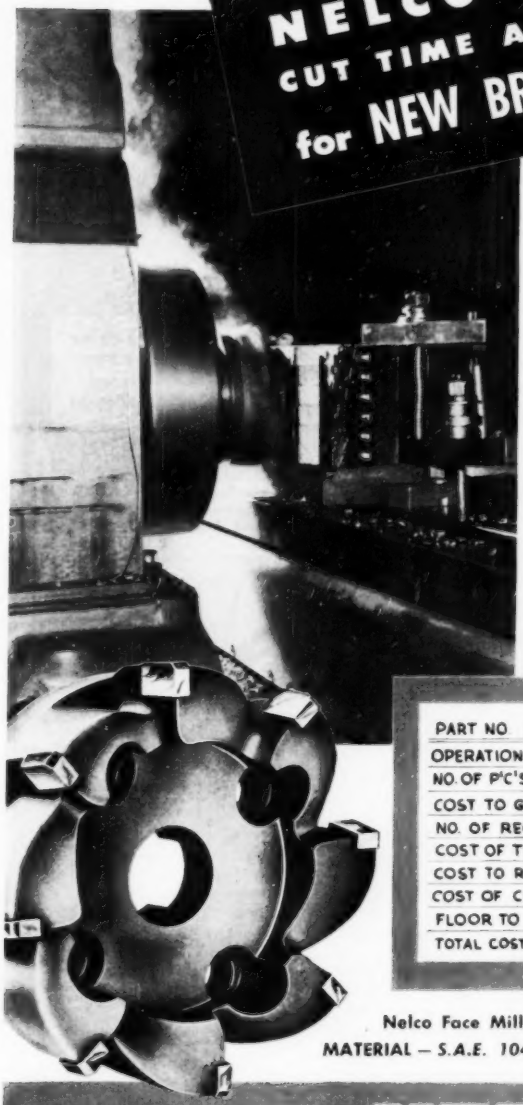
*Here's how*

# NELCO FACE MILLS CUT TIME AND REDUCE COSTS for NEW BRITAIN MACHINE CO.



Milling the Forming Slide Cam blanks for New Britain-Gridley Model 60 six-spindle automatic Bar Machines is done six at a time with the No. 8106F Nelco Face Mill with carbide tipped blades.

The time and cost analysis chart shows the comparative savings effected by Nelco carbide tipped cutters over the tools formerly used. This is only one of many New Britain Parts which are milled efficiently with Nelco Tools.

| PART NO. B 407 1782 | NAME Forming Slide Cam blank | |
|---|---|---|
| OPERATION 110 mill end | CARBIDE | HIGH SPEED |
| NO. OF P'C'S. PER GRIND | 400 | 100 |
| COST TO GRIND | $7.50 | $3.75 |
| NO. OF REGRINDS | 8 | 10 |
| COST OF TIPS | $8.00 | $16.20 |
| COST TO RETIP & GRIND | $16.00 | $6.00 |
| COST OF CUTTER PER PIECE | $ .024 | $.054 |
| FLOOR TO FLOOR TIME | 1½ min | 3½ min |
| TOTAL COST TO MILL ONE P'C. | $.144 | $.334 |

Nelco Face Mill No. 8106F . . . **SPECIFICATIONS**

MATERIAL — S.A.E. 1045 GAS CUT SPEED — 500 R.P.M. FEED — 15" P.M.

WRITE for descriptive literature and name of your Nelco Distributor.

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| Wheel Diameter | Size Number |
|---|---|
| 0" to 10" | 0 |
| 10" to 16" | 1 |
| over 16" | 2 |

*Third:* consider the extra service of six sets of bearings in Desmond's exclusive Hex Dressers (same cutters as Desmond-Huntington dressers). When one pair of bearing holes becomes worn, loosen cap screws, pull out bearing blocks, and insert them with the pin in the next pair of bearings . . . For more practical tips on grinding wheel care, call your industrial distributor. He's at your service. . . . The Desmond Stephan Mfg. Co., Urbana, Ohio.

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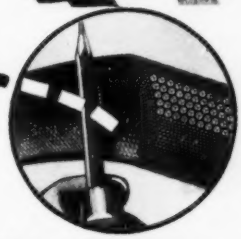
# Make this Test with ANY V-Belt

## You'll See at Once Why the

# CONCAVE SIDE---

(U.S. Patent No. 1813698)



# Saves You Money!

Bend any V-Belt and feel the sides change shape. The top of the belt, under tension, *narrows*. The body, under compression, *widens*. The sides of the belt bulge out.

The result, if the belt is built with *straight sides*, is a shape that does not fit the sheave groove—as shown in Figures 1 and 1A, below.

Straight-Sided V-Belt

How Straight-Sided V-Belt Bulges in Sheave-Groove

Clearly, the bulging of the sides will produce excessive wear along the *middle* of the sidewall as indicated by arrows.

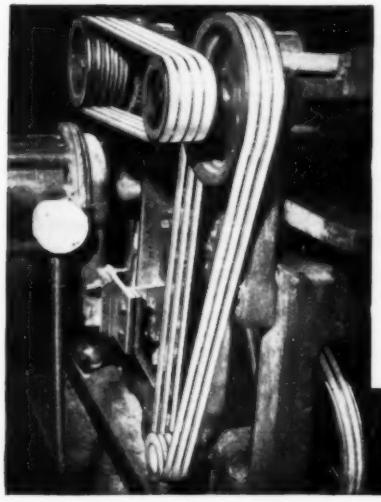
Now, bend a V-belt with the *concave* side—the Gates Vulco Rope.

You get the same shape change but *now* the new shape exactly fits the sheave groove—as shown in Figures 2 and 2A.

Gates Vulco Rope with Concave Side.

No Side Bulge. Precise Fit in Sheave-Groove.

Results? (1) *Uniform* sidewall wear; *longer life!* (2) Full sidewall grip on the pulley. Carries heavier loads and *sudden load increases* without slippage; saves *belts* and also saves *power!*



## The Concave Side is *MORE IMPORTANT NOW* Than Ever Before

Because the *sides* of a V-Belt are what actually *drive* the pulley, it is clear that any increased load on the belt means a heavier load that must be transmitted to the pulley *directly* through the belt's sidewalls.

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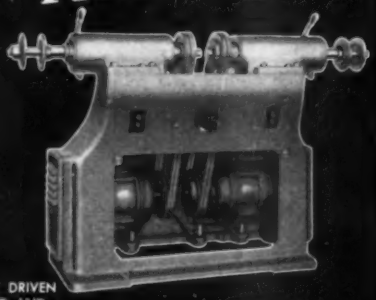

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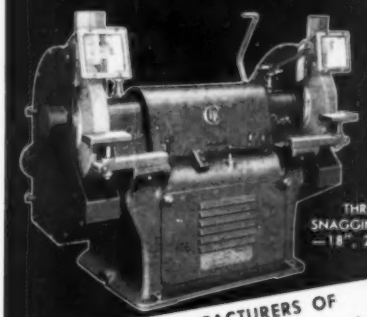

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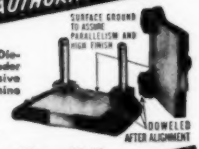


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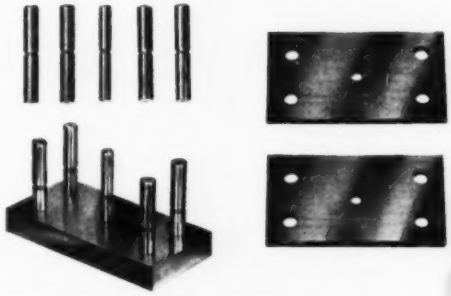

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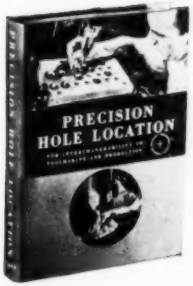


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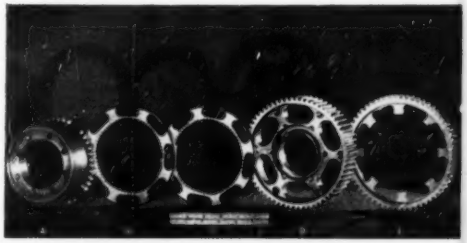

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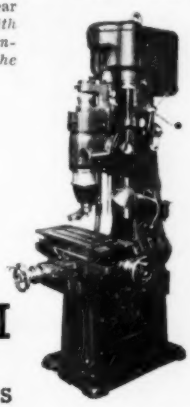

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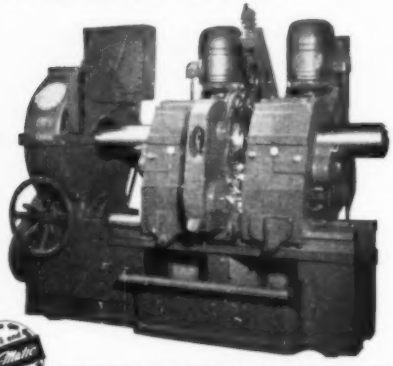

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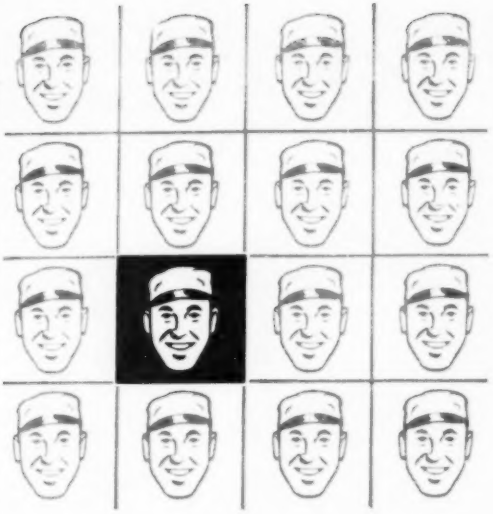

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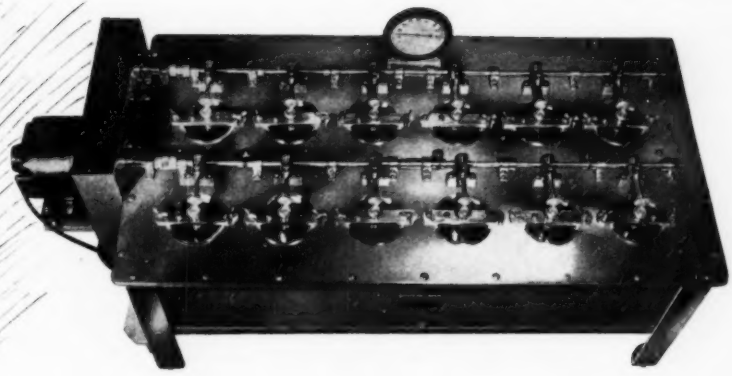

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If the problem is finish, after-protection, closer tolerances, accurate form or increased production, Economy Lubricants will help solve it.

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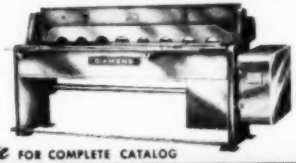
**THE WHITE & BAGLEY COMPANY**
**WORCESTER, MASS. • DETROIT, MICH.**

**Water Solubles for Cutting, Grinding, Drawing, Grinding Oils, Spindle Oils, Sulphurized Fatty Bases**

# DIAMOND

*Engineered* **Power Squaring Shears**

**4, 5, 6 FOOT; 10 AND 14 GAUGE**



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**DIAMOND MACHINE TOOL COMPANY**
3419 EAST OLYMPIC BLVD., LOS ANGELES 23, CALIF.
OFFICE AND WAREHOUSE IN CHICAGO

## HARDNESS TESTER

**The *Scleroscope* is the only hardness tester that takes in the entire range from the softest to the hardest metals without any adjustments.**

**MODEL D-1 DIAL TYPE**
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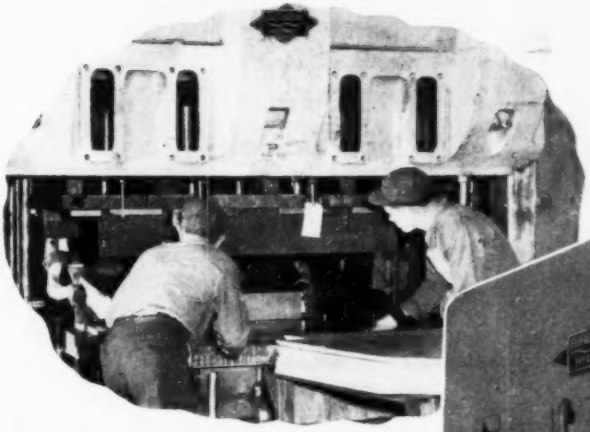
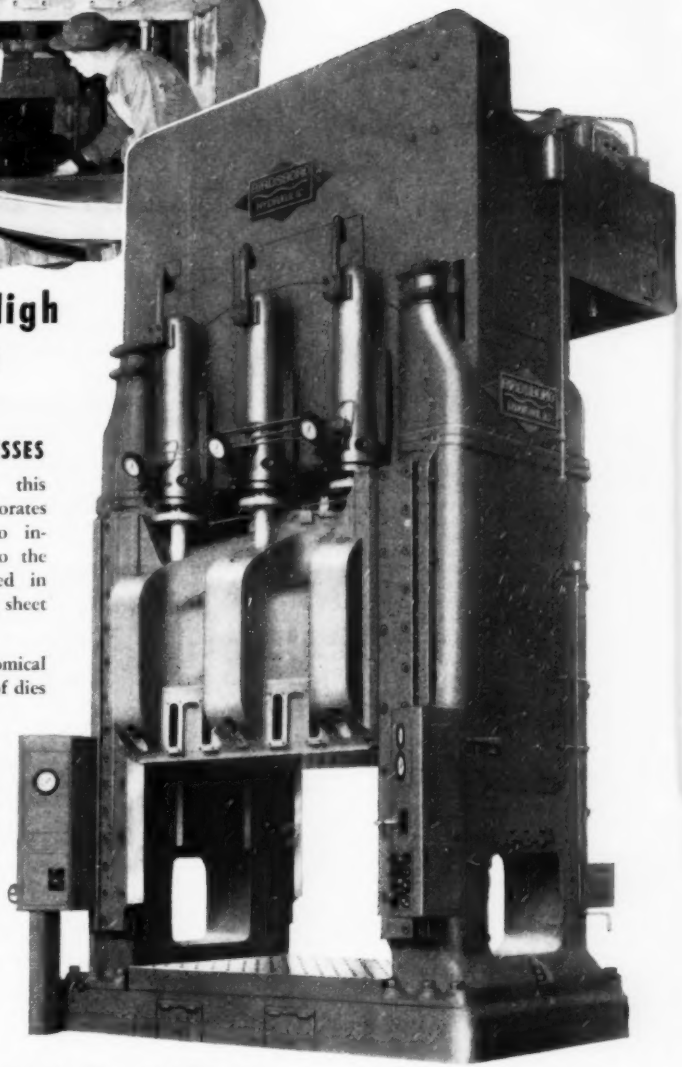
**THE SHORE INSTRUMENT & MANUFACTURING CO., INC.**
**9025 VAN WYCK AVENUE**
**JAMAICA, NEW YORK**
**TELEPHONE: JAMAICA 6-4090**





# Engineered for High Production at Low Cost

## BIRDSBORO HYDRAULIC PRESSES

Through advanced engineering, this Birdsboro Hydraulic Press incorporates new features which contribute to increased flexibility. It is adapted to the many different operations involved in the deep drawing of large and small sheet metal parts.

The press is designed for fast, economical production through quick changing of dies from single to double action operation. It also provides rapid operating cycles under full control of the operator and includes automatic and liberal safety protection for both operator and equipment.

Investigate Birdsboro's engineering facilities which are available at any time to your engineers—to adapt present designs to your needs, or start from scratch—on your press problems.

**Birdsboro Steel Foundry & Machine Co. • Birdsboro, Pa.**

AGENTS IN: Boston, Massachusetts — Chicago, Illinois — Cincinnati, Ohio — Detroit, Michigan — Kansas City, Missouri — Oklahoma City, Oklahoma — Pittsburgh, Pennsylvania — St. Louis, Missouri—Tulsa, Oklahoma

**BIRDSBORO**
**HYDRAULIC PRESSES**

DESIGNERS AND BUILDERS OF:

- Hydraulic Presses
- Steel Mill Machinery
- Special Machinery
- Crushing Machinery
- Steel Castings
- Rolls

HP-4

# When you need steel...
# TRY US FIRST

WHEN you need steel, it's always a good idea to try us first. We are constantly increasing our facilities and expanding our organization in order to serve our customers more quickly and efficiently. For example, new warehouse buildings, scientifically laid out to speed zoning and loading, have been erected in a number of our districts. In several other important marketing areas we have opened new warehouses. And all our plants are being equipped with the latest machinery for cutting, processing and handling materials.

This progressive planning has but one object in view—giving you the very best in steel warehouse service.

As rapidly as possible, we are increasing our stocks. If you will check with us, you will find that many grades and types of steel are now available for prompt delivery.

So, try us first—for steel—for metal-working tools, supplies and machinery. Simply telephone, wire or write the warehouse or sales office nearest you.

*Your inquiries for literature covering Stainless, Alloy and High Strength Steels will be given prompt attention. You're under no obligation.*

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Without obligation on our part, please send us FREE booklets on U-S-S Steels as checked below:

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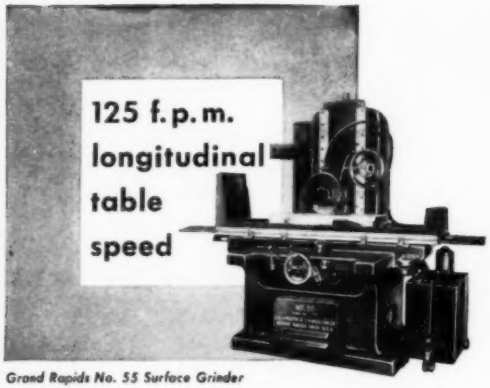
Also Sales Offices at: KANSAS CITY · PHILADELPHIA · TOLEDO
Headquarters Offices at: 208 S. La Salle St.—Chicago 4, Ill.

USS UNITED STATES STEEL






*Grand Rapids No. 55 Surface Grinder*

*Faster precision production* is possible with the exceptional table speed of Grand Rapids Hydraulic Feed Surface Grinders. Both longitudinal table travel and cross feed are automatic, hydraulic. Wheel head is powered for rapid vertical travel.

***Write for Bulletin GL-103.***

**GALLMEYER & LIVINGSTON COMPANY**
*Manufacturers of Grand Rapids Grinders*
**330 STRAIGHT ST., S. W., GRAND RAPIDS 4, MICH.**

• WILSON has maintained and continues to maintain Field Service Engineers who are hardness testing specialists. Their responsibility is to (*1*) study users' requirements, (*2*) recommend equipment that will serve best, (*3*) see that it is correctly installed and (*4*) that it *continues* to give dependable service.

We are originators, exclusive makers of "ROCKWELL" Hardness Testers, "ROCKWELL" Superficial and TUKON Microhardness Testers. Our years of developing and improving hardness testing equipment give our factory-trained representatives background for best possible service to you.

**WILSON**
**MECHANICAL INSTRUMENT CO., INC.**
AN ASSOCIATE COMPANY OF AMERICAN CHAIN & CABLE COMPANY, INC.
ACCO

**230-B PARK AVENUE, NEW YORK 17, N. Y.**

# COPPER ALLOY BULLETIN

**ROD AND WIRE EDITION**

REPORTING NEWS AND TECHNICAL DEVELOPMENTS OF COPPER AND COPPER-BASE ALLOYS

*Prepared Each Month by Bridgeport Brass Co.* "Bridgeport" *Headquarters for BRASS, BRONZE and COPPER*


## Precision Parts Made on Automatics Cut Cost of Surveying Instrument

Surveying instruments are generally very expensive because: (1) they are made to close tolerances and (2) they are produced in small quantity.

Could the price of an expensive surveyor's transit be brought down to earth if its parts were made on automatic screw machines? The answer was "yes", *if* the parts could be made sufficiently accurate by this method.

Precision Screw Products Company of Los Angeles placed their faith on both good machines and uniform, high quality free-turning brass rod. As a result, a surveyor's transit made from their parts can now be purchased for a fraction of the former cost of an instrument made on a small quantity basis.

Most of the components are made from Bridgeport's high speed, free-cutting Ledrite* Brass Rod, which contains approximately 3.4% lead, with special attention to dimensional tolerances, good clean surfaces and uniformity of properties.

Some of the parts are made from Bridgeport's Low Leaded Tubing (approximately 0.5% lead), which has better machinability than non-leaded tubing.

### Variety of Leaded Brass Rod Alloys Available

Bridgeport Ledrite Free-Turning Brass lends itself both to great accuracy and to high speed production of precision parts for thousands of items including scientific and optical instruments, timing devices, engineering instruments, besides every day parts for electric light fixtures, hardware, ornaments, etc. Its high lead content and close control of gauge, microstructure and temper mean less tool wear and greater ease in maintaining close tolerances.

Where machining plus cold working operations are required, such as roll threading, knurling, expanding, etc., Ledrite 2 (approximately 1.8% lead) combines good machinability with ductility. For applications where corrosion resistance is a factor, Leaded Naval Brass combines good corrosion resistance with free machinability.

Bridgeport's Laboratory will be glad to work closely with manufacturers of machined products to help increase production and keep costs down through use of the proper alloy.

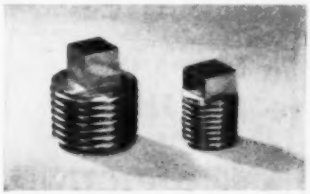
Parts for a precision quality surveyor's transit made on automatic screw machine from Ledrite Free-Cutting Brass Rod and leaded brass tubing. Courtesy Precision Screw Products Company, Los Angeles, California.

## A BETTER PIPE PLUG ...FROM DURONZE** III

There is a saying that if you build a better mousetrap, a path will be worn to your door. This saying can also apply to making a better pipe plug.

Corrosion has always been the enemy of pipe plugs which are generally made either from cast brass or from free-turning brass rod. Corrosive water conditions in time attack the brass by dezincification and eventually the corroded pipe plug will be responsible for leaks.

Atlantic Manufacturing Company of Milford, Connecticut, has solved this problem by making a more corrosion-resisting pipe plug from Bridgeport's Duronze III Rod. This is a Silicon Aluminum Bronze which contains about 91% copper, 7% aluminum, and 2% silicon. Since it does not contain zinc, it naturally is immune to dezincification. In fact, well waters containing an excessive amount of carbon dioxide gas, which dezincifies yellow brass quite rapidly, have no effect on Duronze III. Experience has shown that the Duronze III type of alloys (Aluminum Bronzes) are much more corrosion-resisting than brasses.



Corrosion-resisting pipe plugs made from Duronze III Rod by Atlantic Manufacturing Company, Milford, Connecticut.

For engineering requirements involving severe conditions or heavy loads, Duronze III (Silicon Aluminum Bronze) has good machinability, even though it contains no lead. Recommended tools, speeds, feeds, and lubricants for cutting Duronze III Rod are given in the March, 1949, Copper Alloy Bulletin—Rod and Wire Edition.

### Improving Products Through Better Metals

Design engineers are turning to superior, more corrosion-resisting alloys with the object of improving existing products and for the construction of new ones. From an engineering standpoint, where dependability is a vital factor, every effort should be made to use the best available materials designed to give the longest satisfactory performance with the minimum of maintenance. Fabricators of engineering items are taking the attitude that quality is more important than a slight increase in cost which may result from changing from an ordinary metal to a better one.

Bridgeport's long experience in developing special alloys to meet changing engineering and industrial requirements is available to our customers. Write for a copy of the Duronze Manual, which contains much information on the properties and applications of aluminum bronzes and silicon bronzes. Contact our nearest local office for any help we can tender on your metal problems. *Trademark ** Reg. U. S. Pat. Off.

**COPPER ALLOY BULLETIN**

You may wish to keep a file of Copper Alloy Bulletins. Reprints of this issue and of back numbers are available.

In order to receive them regularly, send in your name, position, and address on company stationery. Comments from our readers are welcome.


**BRASS · BRONZE · COPPER · DURONZE — STRIP · ROD · WIRE · TUBING**

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BRIDGEPORT BRASS COMPANY
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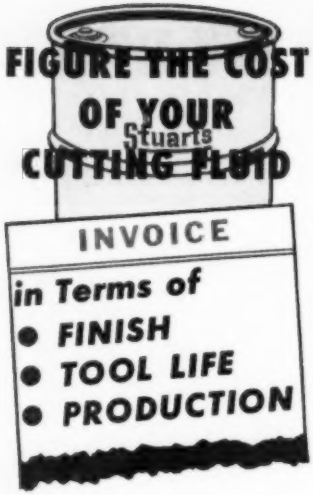
*Established 1865*
"Bridgeport" *District Offices and Warehouses in Principal Cities*




IT is *wise economy* to buy cutting fluids on a basis of performance rather than on a price basis. This is borne out by the case of a large screw products company in Chicago machining 11/16" round stainless steel types 303 and 440. Operations include forming, drilling and reaming on a New Britain-Gridley automatic screw machine. A number of different cutting oils had been used on this job until one was found that seemed to give relatively satisfactory performance. However, this product was replaced after the first trial with Stuart's Thred-Kut. Not only was there a marked improvement in finish, but *tool life was increased 3 to 4 hours and daily production was increased.*

The above case study is a typical example of how the best cutting fluid for the job will pay its original cost over and over again. D. A. Stuart Oil Company representatives preach the gospel of "Wise Economy." They can help you cut costs with cutting fluids best suited to your requirements. Ask for booklet, *Cutting Fluids for Better Machining.*

**STUART** *service goes with every barrel*

**D. A. Stuart Oil Co.**

2729 S. TROY ST., CHICAGO 23, ILL.

# ANTON PARALLELS

- **123 Sizes In Stock For *Immediate Delivery***
- **ANTON PARALLELS ARE HARDENED TO 65 ROCKWELL "C"**
- **ANTON PARALLELS ARE FULLY GUARANTEED to be within the following tolerances in height (ground surfaces):**

| Grade | Height | Parallelism and Straightness Over Full Length |
|---|---|---|
| Standard | ± .001" | ± .0001" |
| Precision | ± .0001" | ± .0001" |

LIST OF STOCK SIZES AND PRICES PER PAIR OF ANTON PARALLELS

| Length In. | Width In. x Height In. | Standard | Precision | Length In. | Width In. x Height In. | Standard | Precision | Length In. | Width In. x Height In. | Standard | Precision |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 6 | 1/4x 3/8 | $4.36 | $5.67 | 6 | 1/4x1- 3/4 | $4.36 | $5.67 | 6 | 1/2x1- 3/4 | $6.50 | $8.45 |
| 6 | 1/4x 7/16 | 4.36 | 5.67 | 6 | 1/4x1-13/16 | 4.36 | 5.67 | 6 | 1/2x1-13/16 | 6.50 | 8.45 |
| 6 | 1/4x 1/2 | 4.36 | 5.67 | 6 | 1/2x 1/2 | 6.50 | 8.45 | 6 | 3/4x1- 3/16 | 8.07 | 10.49 |
| 6 | 1/4x 9/16 | 4.36 | 5.67 | 6 | 1/2x 9/16 | 6.50 | 8.45 | 6 | 3/4x1- 1/4 | 8.07 | 10.49 |
| 6 | 1/4x 5/8 | 4.36 | 5.67 | 6 | 1/2x 5/8 | 6.50 | 8.45 | 6 | 3/4x1- 5/16 | 8.07 | 10.49 |
| 6 | 1/4x 11/16 | 4.36 | 5.67 | 6 | 1/2x 11/16 | 6.50 | 8.45 | 6 | 3/4x1- 3/8 | 8.07 | 10.49 |
| 6 | 1/4x 3/4 | 4.36 | 5.67 | 6 | 1/2x 3/4 | 6.50 | 8.45 | 6 | 3/4x1- 7/16 | 8.07 | 10.49 |
| 6 | 1/4x 13/16 | 4.36 | 5.67 | 6 | 1/2x 13/16 | 6.50 | 8.45 | 6 | 3/4x1- 1/2 | 8.07 | 10.49 |
| 6 | 1/4x 7/8 | 4.36 | 5.67 | 6 | 1/2x 7/8 | 6.50 | 8.45 | 6 | 3/4x1- 9/16 | 8.07 | 10.49 |
| 6 | 1/4x 15/16 | 4.36 | 5.67 | 6 | 1/2x 15/16 | 6.50 | 8.45 | 6 | 3/4x1- 5/8 | 8.07 | 10.49 |
| 6 | 1/4x1 | 4.36 | 5.67 | 6 | 1/2x1 | 6.50 | 8.45 | 6 | 3/4x1-11/16 | 8.07 | 10.49 |
| 6 | 1/4x1- 1/16 | 4.36 | 5.67 | 6 | 1/2x1- 1/16 | 6.50 | 8.45 | 6 | 3/4x1- 3/4 | 8.07 | 10.49 |
| 6 | 1/4x1- 1/8 | 4.36 | 5.67 | 6 | 1/2x1- 1/8 | 6.50 | 8.45 | 6 | 3/4x1-13/16 | 8.07 | 10.49 |
| 6 | 1/4x1- 3/16 | 4.36 | 5.67 | 6 | 1/2x1- 3/16 | 6.50 | 8.45 | 9 | 1/4x2 | | |
| 6 | 1/4x1- 1/4 | 4.36 | 5.67 | 6 | 1/2x1- 1/4 | 6.50 | 8.45 | 9 | 1/4x2- 1/4 | | |
| 6 | 1/4x1- 5/16 | 4.36 | 5.67 | 6 | 1/2x1- 5/16 | 6.50 | 8.45 | *MAGNETIC CHUCK PARALLELS (Standard) | | | |
| 6 | 1/4x1- 3/8 | 4.36 | 5.67 | 6 | 1/2x1- 3/8 | 6.50 | 8.45 | 6 | 1/4x 1/2 | PRICES FURNISHED ON REQUEST | |
| 6 | 1/4x1- 7/16 | 4.36 | 5.67 | 6 | 1/2x1- 7/16 | 6.50 | 8.45 | 6 | 1/4x1-13/16 | | |
| 6 | 1/4x1- 1/2 | 4.36 | 5.67 | 6 | 1/2x1- 1/2 | 6.50 | 8.45 | 6 | 1/2x1- 1/2 | | |
| 6 | 1/4x1- 9/16 | 4.36 | 5.67 | 6 | 1/2x1- 9/16 | 6.50 | 8.45 | 6 | 3/4x1- 1/4 | | |
| 6 | 1/4x1- 5/8 | 4.36 | 5.67 | 6 | 1/2x1- 5/8 | 6.50 | 8.45 | | | | |
| 6 | 1/4x1-11/16 | 4.36 | 5.67 | 6 | 1/2x1-11/16 | 6.50 | 8.45 | 9 | 2 1/4x3 | | |

**PRICES ON COMPLETE SETS OF PARALLELS**
**(In a Neat Wooden Container)**

| | 1/4" Th. x 6" L. (22 Pairs) 1/2" to 1-13/16" High Inclusive by 1/16" | 1/2" Th. x 6" L. (11 Pairs) 1/2" to 1-1/8" and 1-3/16" to 1-13/16" High Inclusive by 1/16" | 3/4" Th. x 6" L. (11 Pairs) 1-3/16" to 1-13/16" High Inclusive by 1/16" |
|---|---|---|---|
| STANDARD | $96.00 | $71.00 | $88.75 |
| PRECISION | 124.00 | 92.00 | 115.00 |

All Prices are F.O.B. New York

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THERE'S A **RIGHT** LOCK NUT FOR YOUR JOB!

**Chances are four out of five it's An-cor-lox. Check these advantages!**

- Can't shake loose
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- Uses standard wrenches
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- Spins on stud by hand
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Get the right lock nut! We strongly urge a careful testing and will be glad to have our engineers check special applications. Send today for our descriptive folder or free standard samples to fit your particular needs.

**An-cor-lox** TRADE MARK REGISTERED *Lock Nuts*

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AN-COR-LOX NUTS • SHIMS • SHIM STOCK • STAMPINGS

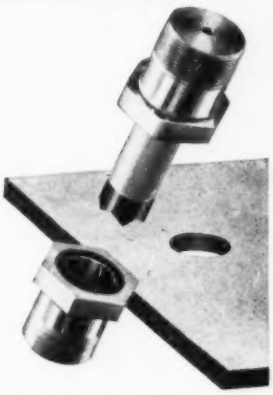
# MONEY-SAVING REASONS

## . . . FOR THE SWING TO CARBOLOY® PRESS DIES!

**When the** manufacturer of these metal door knobs switched from steel to Carboloy dies, die life increased *ten times*—and at latest reports, the Carboloy sheet metal dies still needed no polishing!

**5,000,000 rod** bearings were formed with Carboloy dies, *without refinishing the dies!* Savings to date: the cost of 7 steel dies, 44 maintenance hours—and the Carboloy sheet metal dies are still going strong!

**After 380** hours of punching plaster wallboard, this Carboloy punch and die showed only .0025-.003" wear. Steel punches wore .012" to .015" in half the time, only lasted one-twelfth as long.



**600,000 Inconel** pencil points were drawn by Carboloy dies—without polishing! And with the same dies 125,000 stainless steel points have been drawn to date—with no measurable wear!

### You can get the same amazing results

A Carboloy engineer will gladly call on you, at your convenience, to help you with any die problem. Send for the Carboloy DIE ENGINEERING MANUAL, D-124, to find out more about the advantages Carboloy Cemented Carbide sheet metal dies can give you.

**CARBOLOY COMPANY, INC.**
**11149 E. 8 Mile Street** **Detroit 32, Michigan**

**Before sharpening,** 2,200,000 strokes were made on the Carboloy die for blanking these electric motor laminations! Steel dies averaged only 100,000 strokes on each sharpening.

**SPECIFY FOR ANY KIND OF PRESS-DIE WORK**

**CARBOLOY®**
CEMENTED CARBIDE

*The*

**GOSS & De LEEUW**

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**7 spindle tool rotating automatic chucking machine**

***Four Machine Spindles*** for boring, turning, facing and reaming operations on one to three ends provide greater and quicker production than any other "chucker" in the machine tool industry.

***Three Threading Spindles*** perform from one to three right or left hand single or double threading operations, on one, two or three ends simultaneously, in perfect alignment, at productions from 100 to 500 pieces per hour.

*Write for further interesting details.*

**Goss & DeLeeuw**
MACHINE COMPANY
KENSINGTON, CONNECTICUT, U.S.A.

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## *Efficiency*

## Economy

These three factors are the key-note of our special tools and machinery. Columbus Die-Tool builds and designs the tool for your particular purpose and will solve the toughest tooling problems effectively and promptly. Do not hesitate to consult us, our experience in this field is most comprehensive.

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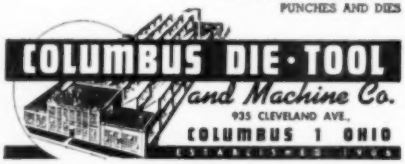
BUILDING COMPLETE MACHINE TOOLS
UNITS FOR MACHINE TOOLS
PUNCHES AND DIES



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ESTABLISHED 1906

**60 YEARS MANUFACTURING**

Multiple Spindle Drilling and Tapping Machines — Automatic Drilling and Tapping Units — Multiple Spindle Attachable Drill Heads—Hot and Cold Swaging Machines—Hammering Machines — Tools, Jigs & Fixtures — Contract Work — Special Machinery

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They save 50% on sawing, filing and lapping operations, easily maintaining .002" limits. Ask for special bulletin—also circulars on Drill Grinders, Point Thinners, Tool and Cutter Grinders, Face Mill Grinders and Tool Bit Grinders.

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*Lassy* **TAPPERS AND THREADERS**

**Direct Reading Depth Gauge Saves Taps**

Single Hollow Spindle for good tap "feel". Finger Tip Control. Tap capacity 1/8" to 1". Hundreds in Use.

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IMMEDIATE DELIVERY

This is Bench Model
Also made in Floor Model

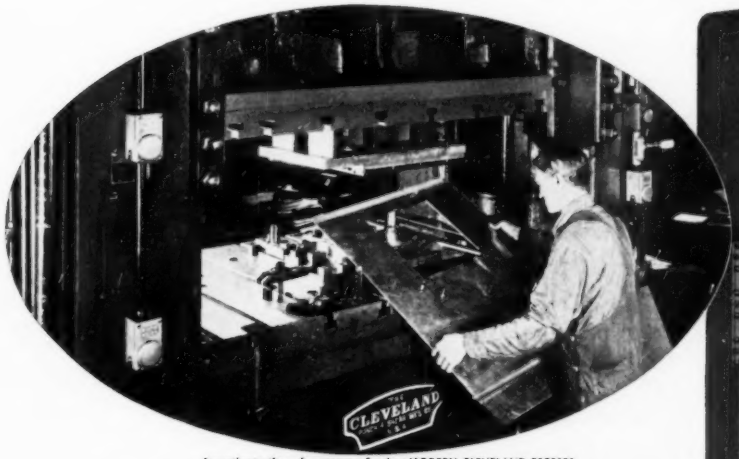
**LASSY TOOL CO.**
Plainville, Conn.

# CLEVELAND'S ARE RUGGED

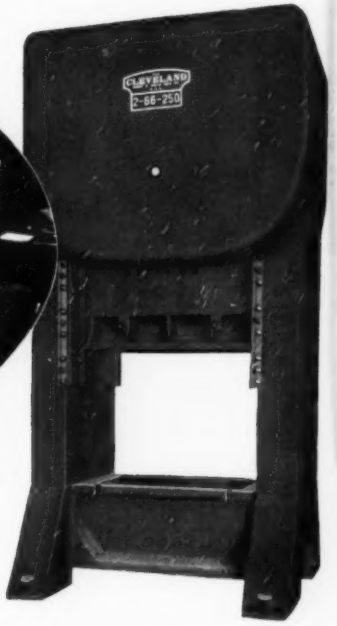
## *Accuracy Assured*

Modern Cleveland Presses have been used for years at the main plant of the Iron Fireman Manufacturing Co. in Cleveland, to stamp out parts varying from 7 to 20 gauge. The men at the Iron Fireman who are responsible for the steady flow of accurate parts have found, by experience, that Modern Cleveland Presses are ideally suited for the production of large and irregular shapes of heavy gauge material, as well as for difficult light gauge work. The ability of Cleveland Presses to economically produce the diversity of stampings used in the construction of Iron Fireman products is due, in large measure, to the sound designing of Modern Cleveland Presses, plus their rugged construction which assures the utmost rigidity and constant accuracy of alignment between the slide and the bed, thereby eliminating undue deflection under load.

CLEVELAND offers higher manufacturing efficiency at lower operating cost with a complete range of fourteen types of Presses in sizes and capacities to meet your particular requirements.

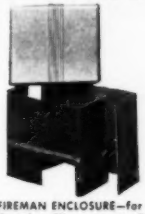



Investigate the advantages of using MODERN CLEVELAND PRESSES equipped with the new (patented) DRUM TYPE CLUTCH & BRAKE.




Cleveland Two Point Press equipped with electrically controlled air operated friction clutch. Stroke of slide 12", adjustment of slide 5", shut height 20", strokes per minute 20, area of bed 40" x 66", capacity 250 tons.

IRON FIREMAN FURNACE TOP —7 gauge steel



IRON FIREMAN ENCLOSURE—for bin-fed stoker, 20 gauge steel

IRON FIREMAN BOTTOM—for domestic stoker, 7 gauge steel

*WRITE FOR BULLETIN (44)*

**THE CLEVELAND PUNCH & SHEAR WORKS CO.**
U.S.A.

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lowers cost of carbide blocks
and increases precision
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*Standard equipment at no extra cost in A blocks; small additional charge in B blocks.
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● *Write for Bulletin MM-1*

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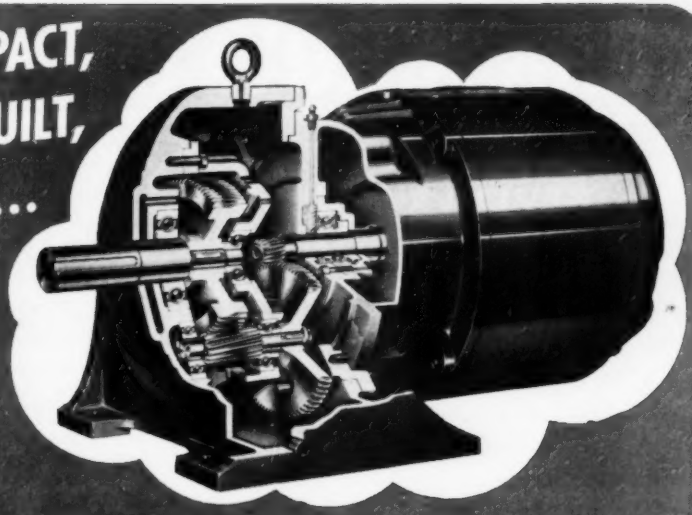

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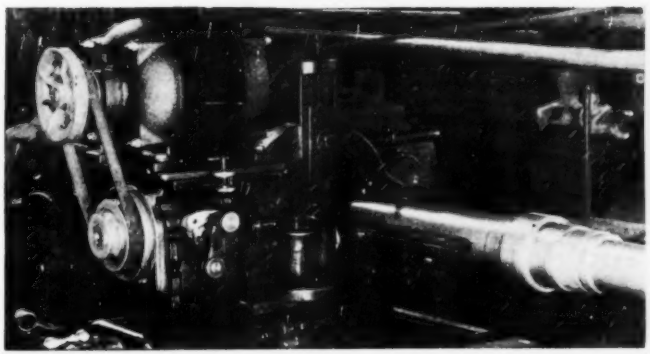

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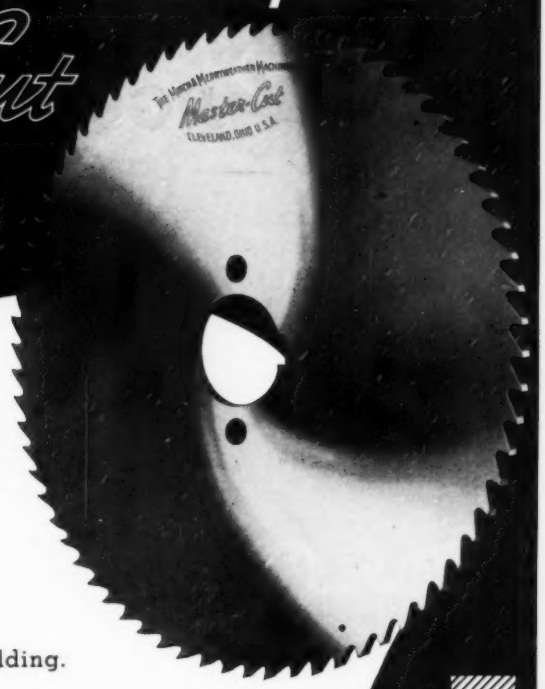


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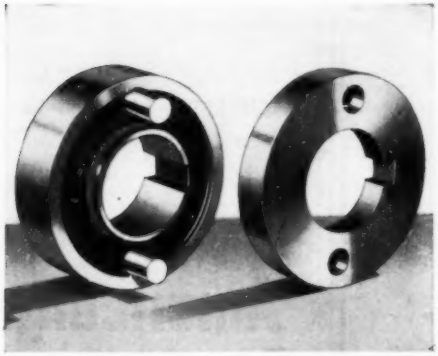

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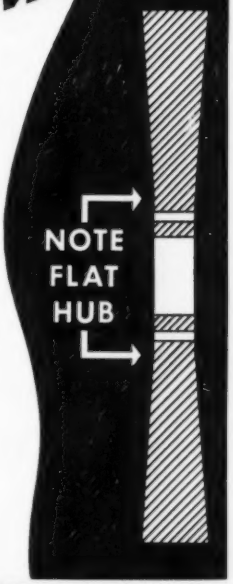


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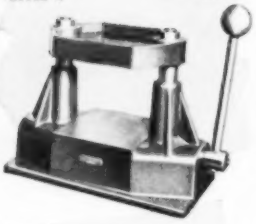

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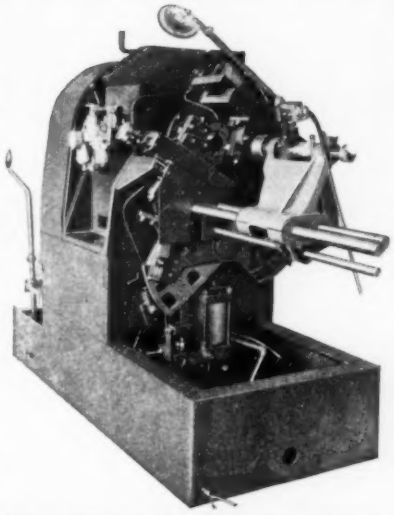

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**The advertising rate is $9.00 per inch for all advertising appearing on other than a contract basis. Contract rates quoted on request.**

**AN ADVERTISING INCH is measured ⅞ inch vertically on one column, 3 columns—30 inches to a page.** **A.M.**

*NEW ADVERTISING received by 10 A. M. April 19th will appear in the issue of May 5th subject to limitation of space available*

*REPLIES (Box No.):*
*Address to office nearest you*
*NEW YORK: 330 W. 42nd St. (18)*
*CHICAGO: 520 N. Michigan Ave. (11)*
*SAN FRANCISCO: 68 Post St. (4)*

## PLANT MANAGER

for Machine Shop, Iron Foundry and Plate Shop, employing 300 men, in Eastern Pennsylvania, manufacturing heavy machinery for Crushing, Smelting and Process Industry. State age, experience, qualifications and salary expected.

P-8420, AMERICAN MACHINIST
330 W. 42 St., New York 18, New York

## CONTRACT WORK


**PATTERNS in WOOD and METAL**
For All Kinds of Castings, Large or Small
MATCH PLATE WORK A SPECIALTY
Put your pattern problems up to us—we will take care of them.
GENERAL PATTERN WORKS
3333 Bank Street Cincinnati, Ohio



# AN IMPORTANT MESSAGE TO MANUFACTURERS

(WITH OR WITHOUT THEIR OWN FOUNDRY)

**CIRCULAR IRON CASTINGS**

can, in most cases, be made by us *without patterns*, thus saving time, trouble and money.

Yes, fine quality, accurate iron castings for Pulleys, Flywheels, Gear Blanks, etc., can be made by us in most any size and quantity. (We've been doing such work for 92 years.)

*Send us sketch or blueprints for prices.*

**T. B. WOOD'S SONS CO.**
CHAMBERSBURG, PA.


## POSITIONS VACANT

OLD ESTABLISHED Machine Tool builder has opening for an Assistant Superintendent, prefer man with fifteen to twenty years experience, most of which should have been in machine tool field and with several years experience supervising as general foreman or above. Must have practical knowledge of production control and shop estimating. For aggressive, capable man this position offers good opportunity for future advancement. Give experience, age, and salary expected. Will treat replies in strict confidence. P-8507, American Machinist.

MAINTENANCE SUPERVISOR who is capable of following through on work, also of bearing the responsibility for work of his men, and, if necessary, training them along lines of machine shop, electrical, pipefitting, welding and millwright work. Opening is at process plant in central New York. Please state ful details of experience in first letter. P-8626, American Machinist.

## EMPLOYMENT SERVICE

SALARIED POSITIONS $3,500-$35,000. If you are considering a new connection communicate with the undersigned. We offer the original personal employment service. 39 years recognized standing and reputation. The procedure of highest ethical standards is individualized to your personal requirements and develops overtures without initiative on your part. Your identity covered and present position protected. Send only name and address for details. R. W. Bixby Inc., 266 Dun Bldg., Buffalo 2, N. Y.

## POSITIONS WANTED

SALES CONSULTING Engineer desires position with reliable concern—10 years experience in production type machinery. Married—34 yrs. of age. Your interest will prove an investment. PW-8522, American Machinist.

TOOL AND DIE Maker with sales experience, as demonstrator salesman or trouble shooter. Available to travel. Best of references as to stability and integrity. PW-8610, American Machinist.

## SELLING OPPORTUNITIES WANTED

MANUFACTURERS REPRESENTATIVE in the Pittsburgh district wishes to handle bar steel, sheet steel, forgings, cast steel and cast iron casting account. Fifteen years industrial sales experience in this territory. RA-8138, American Machinist.

## CONTRACT WORK

**Small shop**

wants additional work for lathe, mill, etc. Reasonable rates. CW-8554, American Machinist.

## NOTICE

**Tool Box stolen.**

Set tool makers tools including unusual Carl Zeiss, 2 inch heavy duty micrometer engraved initials W. W. W. Notify W. W. Weese, 6432 Cass Avenue, Detroit, Michigan.

## PATENT ATTORNEY

**Patent Practice**

before U.S. Patent Office, Validity and infringement investigations and opinions. Booklet and form "Evidence of Conception" forwarded upon request. Lancaster, Allwine and Rommel, Registered Patent Attorneys, Suite 453, 815-15th Street, N. W. Washington 5, D. C.

## WILL TRADE FOR OLD STYLE CONE DRIVEN MACHINE TOOLS

***PRACTICALLY NEW***

Liberty 48"x48"x16' double housing Planer, mfg. in 1942, serial No. 531-6. With four heads (two rail heads and two side heads). Complete with DC motor Drive, Generator, etc. Excellent Condition.

*For Less Than 50% of Present Day Cost!*

**Price, F.O.B. Indianapolis—$16,000**

**WINSTON MACHINERY CO., INC.**
517 S. Delaware St., Indianapolis 4, Ind.

## SURPLUS STOCK

80,000 lbs. 1-5/16" round, cold drawn steel, B-1112, 10-12 ft. lengths. Price $4.80 per 100 lbs., F.O.B. Niagara Falls, N. Y. Condition as received from Mill. Write to

**WALTER BRODA**
489—22nd ST., NIAGARA FALLS, N. Y.

## GOOD TOOLS

2-6 B & S Automatics, cap. 2"x5"
6"x20" P & W Thread Miller, 1945
2-1S Cinn. Acme Turret Lathe, Chucking 1943
Simmons Turret Lathes, 1¼" cap., late
60" Bullard Boring Mill, old machine

WILLIAM R. CURRIER, MACHINE SALES
1097 Dixwell Ave., Hamden, Conn.

## WANTED

**WANTED**

P&W 14" Lathe 8' bed. Cone drive head and taper attachment. Serial 1200 to 1900 Reed Prentice 14" Multi-Tool Gun Barrel Turning Lathe. 30" or more between centers. 1915 or later. Condition not important. Reply to

**W-8541—AMERICAN MACHINIST**
330 W. 42 ST., NEW YORK 18, N. Y.

IF THERE IS

**Anything you want**

**that other readers of this publication can supply**

**OR—**

**Something you don't want**

**that other readers can use, advertise it in the**

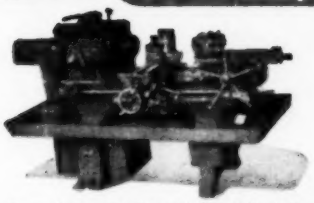
**Searchlight Section of American Machinist**

BUY FROM STOCK
Telephone
HAMILTON 8744-45

# FALK
## MACHINERY COMPANY

18 WARD ST.
ROCHESTER 5
N. Y.

*Every Item Guaranteed as Represented*



Warner Swasey #3 Universal Geared Head Bar Feed Ram Type Turret Lathe. Late Type. 3/60/220/440 volts motor. FIVE AVAILABLE—some have tooling.

### TURRET LATHES

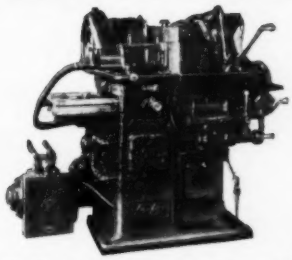
Morey #2 Geared Head 1" Cap., M. Dr.
Simmons Microspeed 1" Cap., M. Dr.
Oster #601 Hand Screw Machine 1½ cap.
W-Swasey #4 Univ. 1½" cap., M. Dr.
Jones & Lamson #3 Univ. Bar Feed, 1½"
W-Swasey #3 Univ. 1½" cap., M. Dr.
Gisholt #4 Univ. 2" cap., M. Dr.
W-Swasey #2A Univ. 2½" Cap., M. Dr.
Bardons & Oliver #7, Univ. 2½" Cap.
W-Swasey #3A Univ. 3½" cap., M. Dr.

Buffalo #0 Bending Rolls. Pinch Type, motor driven. With formers for bending angles, raunds, squares, pipe.
Buffalo #1 Wrapping Rolls. Motor driven. Capacity— 3½x3/8x9
Niagara Initial Type. 12'x1/16" capacity.
Webb #2L 5'x10ga. Initial Type Bending Rolls. 5 h.p.

Barnes #307 Single Spindle Hydraulic Twin Cylinder Vertical Honing Machine. Late Type complete with coolant system and 220/440 volts motors and controls. Six speeds, #5 morse taper. TWO AVAILABLE. One has Positive Depth Stop & Dwell Mechanism.

### ENGINE LATHES

26"x14' Lodge Shipley, M.Dr. 8'2½" c.c.
25"x14' LeBlond, Taper Att. 8'2" c.c.
20"x18' American Grd. Hd. Motorized. Taper Attachment. 13'8" c.c.
20"x10' Hendey Motorized.
24"x12' Putnam Motorized. On raising blocks to swing 32" with 66" c.c.
36"x30' LeBlond Geared Hd. Motor Dr.
32"x16' Bridgeford, Geared Head, M. Dr.
28"x10' Davis Quick Change Gear
26"x18' Bridgeford, Geared Head, M. Dr.
24"x16' American Q.C.G. Grd. Hd. 11' centers, Taper Attach. Motor Dr. Equipment
24"x14' Lodge & Shipley, Motorized
24"x16' American Motorized
20"x11' Schumacher-Boye, Q.C.G.
20"x10' American, Q.C.G. 72" centers
20"x8' Lodge & Shipley, Q.C.G. M. Dr.
18"x8' Davis Q.C.G. 42" centers, equipment
18"x8' Lodge & Shipley, geared head
18"x8' Hendey Q.C.G. 49" centers
18"x6' American, Geared Head, M.D.
16"x12' South Bend Q.C.G. Enclosed Head Underdriven with 1½ h.p. motor & controls. 105½" centers. NEW—1946. Has chuck, turret tool post, 2-steady rests, faceplates. Excellent condition. Immediate delivery from stock.
16"x8' Hendey Q.C.G. M. Dr.
16"x6' Lodge & Shipley Geared Head
16"x6' Lodge & Shipley "Patent Head", Motor Dr.
16"x6' South Bend Enclosed Head, Motor driven. Taper Attachment, Chucks, Collets & Quick Acting Collet Chuck.
14½"x6' South Bend Enclosed Head, Motor Driven. Taper Attachment, chucks, Turret Toolpost Threading Dial, Ram Type Turret Attachment, collets & Collet Chuck.
14"x8' Reed-Prentice Eight Speed Selective Geared Head, Q.C.G. Motor drives w/220/440 volts motor & controls. Has Taper Att. chuck, faceplates, steady rest, cabinet legs, max. centers —48". Completely rebuilt. Immediate shipment.



Greenfield #12 Hydromatic Internal Grinder. Serial #11766. With Automatic Sizing Features. 7½ h.p. 3/60/220 volts motor.

### GRINDING MACHINES

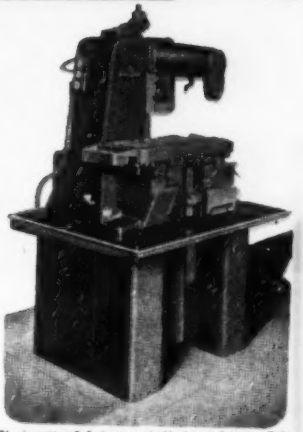
J & L #TG-615 Automatic Thread, M. Dr.
Brown & Sharpe #2 Auto. Surface, 6x18
Pratt & Whitney 14x36 Vertical Surface
Blanchard #16, 26" Vertical Surface
Abrasive Automatic Surface 22x8
Reid #2 Automatic Surface, 6x18
Heald #25 Rotary Surface
Heald #70 Internal, Belt drive
Heald #60 Internal, Belt drive
Norton #2 Univ. Tool & Cutter, Belt Dr.
G & Livingston #4 Tool & Cutter
Cincinnati #2 Tool & Cutter, M. Dr.
Cincinnati "Monoset" Tool & Cutter
Cincinnati #7 Centerless, M. Dr.
Greenfield #12 Internal Hydraulic
Brown & Sharpe #10 Cylindrical 6x18
Brown & Sharpe #11 Cylindrical 10x30
Brown & Sharpe #4 Univ. Cylindrical 12x60
Brown & Sharpe #5 Plain Cylindrical
Oliver of Adrian #51 Drill Grinders
Thompson 6x18 Hydraulic Horiz. Surface. Wet & dry work. 220/440 motor driven. Auto. downfeed to head. Motor driven exhauster unit.
NEW—Leach 6x12 Horiz. Surface. 220 volts motor, ball-bearing Spdle. Permanent magnetic chuck. Immediate shipment from stock.
Norton 6x36 Horiz. Surface. 220/440 volts motor. Has extra grinding wheels and 40x9 chuck. For wet & dry work. Excellent condition.

### AUTOMATICS

No. 0 & No. 00 Brown & Sharpe
No. 0 Brown & Sharpe Automatic Cutoff
#2G Brown & Sharpe High Speed Automatic Screw Machine. Serial #6814. Self-contained 5 h.p. 3/60/220/440 volts motor drive & controls. Complete coolant, toolposts, gears, collets. FOUR AVAILABLE.
#2 Brown & Sharpe Automatic. Turner drive 220/440 volts motor. With Stock stands, collet, toolposts, coolant system, change gears. FOUR AVAILABLE.
Cleveland Model "A" 3¾" capacity Single Spindle Motor Driven Automatic. Has lot of tooling, collets, motors and switches & coolant system.

### PUNCH PRESSES

Niles Bement & Pond Horiz. Hydraulic Wheel Press. 200 tons capacity. 48" between strain bars.
Bliss #18, #20, #20B, #21 O.B.I. Motorized.
Ferracute #86 Wide Frame, motor driven. 61½" between housings. 13¼" stroke.
Michigan O.B.I. 36 tons cap. 2" stroke. Wide Ram, wide Bed. Motor driven
Lucas 15 tons, Power Arbor Press. M. Dr.
McCall No. 4 O.B.I. 2½" stroke, 25 tons.
NEW Johnson O.B.I. Presses. All sizes.
Bliss #305 Geared S.S. Single Action
Nilson 56 tons S.S. Dbl. Crank 3-Die Transfer Press
Toledo #5 O.B.I. 44 tons capacity.
Federal #3 O.B.I. 26 tons capacity.



Cincinnati #0-8 Automatic Horizontal Motor Driven Milling Machines. Some with Rise & Fall Mechanism. FIVE available.

### MILLING MACHINES

Nichols Hand, Late Type, M.D. (six)
Sundstrand #0 Rigidmil, M.D.
Whitney #6 Hand, Cone Drive
Hardinge B.B. Vertical, Bench
Becker #5C Vertical, Cone Dr.
Knight #1½C Vertical
Cincinnati #3 & #4 Vertical. Dial Type
Cincinnati #3, #4, #5 Pl. Horz.
Brown & Sharpe #12 Production. 18" Autom.
Brown & Sharpe #12 Production. 24" Autom.
Brown & Sharpe #0, 1, 1Y Horizontal
Kempsmith #1, #2 Plain Horiz.
Cincinnati 18" Mfg. Plain
Milwaukee #2K Vertical, M. Dr. H. Speed
Milwaukee #3K Vertical, M. Dr. H. Speed
Milwaukee #1½ Dbl. Overarm, Horiz.
Milwaukee #2B Dbl. Overarm, Horiz.
Milwaukee #3B Plain Horizontal
Pratt & Whitney #2 Duplex, Motorized
Cincinnati #0-8 Vertical. Motor driven. (EIGHT AVAILABLE)

### UNIVERSAL MILLING MACHINES

Ames Bench, 12"x3"x7¼"
Index #40H, 16"x8½"x16"
B & S #2, 20"x5"x17½"
B & S #1½, 20"x7"x18"
Bridgeport, 20"x9"x16"
B & S #1D, 24"x8"x15"
Garvin #2MU, 24"x8"x18"
K & T "Milwaukee" #2, 28"x10"x17"
Kempsmith #2, 28"x8½"x18"
Cincinnati #2, 28"x10"x18"
Cincinnati #2M, 28"x10"x18"
B & S #3, 34"x10"x21"
Cincinnati #3S, 34"x12"x20"
Some w/index heads & equipment

### SHAPERS

Shaper—Columbia 32" B.G. Crank, motorized. Power downfeed to head.
Shaper—Logan 7" Horizontal. NEW
Shaper—Machinery Sales 16", motorized
Shaper—Gould & Eberhardt 16", motorized
Shaper—Smith & Mills 16", motorized
Shaper—Smith & Mills 16" Universal
Shaper—Gould & Eberhardt 18" B.G. Crank
NEW—Gemco 20" Universal Shaper. M. Dr.
Shaper—American 24" crank, motorized
Planer—Shaper—Niles-B. Pond 20x20x24

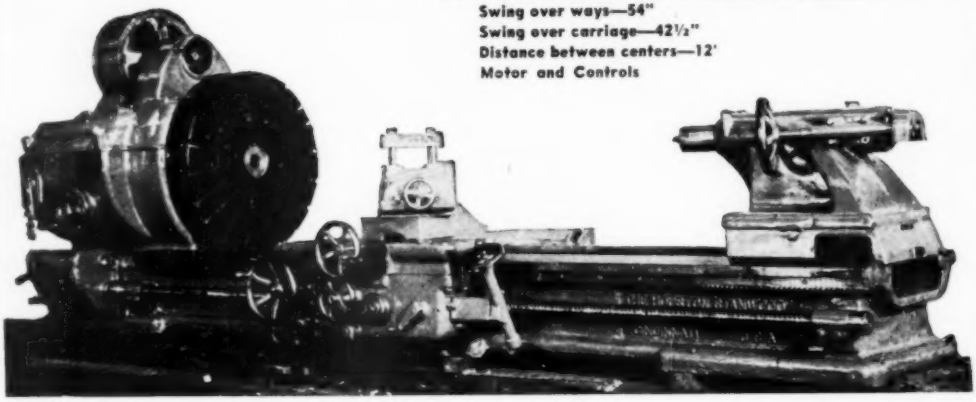
### DRILLING MACHINES

Cinci-Bickford 6' Arm, 15" col. Radial
Cinci-Bickford 5' Arm, 13" col. Radial
Fosdick 5" Arm 14" col. Radial
American 4' Triple Purpose Radial, M. Dr.
Cincl-Bickford 3' Arm, 9" Col. Radial. Motor driven. W/table. 12 Speed gearbox.

# Heavy Duty Engine Lathe

**54" x 18' HOUSTON STANWOOD & GAMBLE**

**Swing over ways—54"**
**Swing over carriage—42½"**
**Distance between centers—12'**
**Motor and Controls**



**7" DETRICK & HARVEY PLANER TYPE BORING MILL**

**27" x 38' LEHMANN HOLLOW SPINDLE LATHE, 9" HOLE IN SPINDLE**

## EMERMAN MACHINERY CORP.

875 W. 120TH ST.
CHICAGO 43, ILL.

*Late Type* — **EVERY MACHINE TESTED AND GUARANTEED AS REPRESENTED** — *Immediate Delivery*

### LATHES

HENDEY 12"x42" tool room (1947)
PRATT & WHITNEY 14"x30" Model C
SOUTH BEND 16"x3½", 14½"x6', 16"x8'
BRADFORD, 15"x6'
HENDEY 16"x6', taper attach.
RIVETT No. 608 taper attach. precision
LE BLOND 'REGAL' 15"x4'
ELGIN & HARDINGE PRECISION, 1" cap.
PRATT & WHITNEY 10"x20", precision
PRATT & WHITNEY, 13"x6', taper attach.
SEBASTIAN 12"x6' GH M.D.
AMERICAN 14"x8' M.D.
SPRINGFIELD 16"x6'; Motor In Base, 12 speeds
MONARCH 14"x8' GH TA
AMERICAN 26"x15' GH, QC, TA.
REED PRENTICE 20"x8', Late, 1943.
HARDINGE Precision second operation

### TURRET LATHES

GISHOLT bar equip. preselector, #5, #1L
WARNER & SWASEY #1A chucking
FOSTER #3 universal, bar feed
WARNER & SWASEY #1, ⅝" cap. hand.
BROWN & SHARPE #1 Hand Screw
BARDONS & oLIVER #5 Preselector 2" cap.

### SHAPERS

Gould & Eberhardt, 20" Industrial
Stockbridge 16" M D.
South & Mills 1946

### DRILL PRESSES

American Radial, 4'x11" column
Avey, #2 single spindle, 15" overhang
Allen, 6 spindle, #2, 12" overhang
Buffalo #22 BG, PF, #4 MT.
Cleeman drill box col. 27", #MT.
Walker Turner Radial ½ H.P.

**AMERICAN HOLE WIZARD RADIAL DRILL 6"x15" col. BOX TABLE.**

### GRINDERS

Cincinnati Universal Grinder 12"x36" ext. int.

NORTON #2 Universal Hydraulic Tool & Cutter
COVEL #91A & #6 tool & cutter universal & #12
LANDIS cylindrical, type H, 4"x12"
HEALD #72A3, plain internal, HYD.
BLANCHARD, VERTICAL SURFACE, #16, 26"
BLANCHARD, VERTICAL SURFACE, #11, 16"
BROWN & SHARPE, #3 surface hyd.
REID, SURFACE, 2B Pope spindle
RIVETT #104—Int.—Ext. Latest
BROWN & SHARPE #2 & #2B Surface
Excelo Thread Grinder #31
GALLMEYER & LIVINGSTON 12x24 Hydraulic
Do-All Hyd. Surface Grinder 6"x18"
Wicaco Precision Internal
Cincinnati cylindrical 12x22" centers
GARDNER 3B Polishing Lathe, Dust Collector

### BOREMATICS AND BORING MILLS

Automatic screw machines
DeHaas #22A Horizontal 3¾" Bar
Lucas No. 41, 3" cap. extra long table

### PRODUCTION MILLERS

CINCINNATI #1-12 automatic
KEARNEY & TRECKER #1H-18 Mfg. type
BROWN & SHARPE #000, high speed

### GEAR MACHINERY

FELLOWS #6IA
GLEASON 18" and 24" cap. Bevel Gear Cutters
GOULD & EBERHARDT, #745, spur gears
Barber Coleman #12, 12" cap.
Gleason 5" straight bevel & 5" spiral
Gleason Gear Tester

### AUTOMATIC SCREW MACHINES

BROWN & SHARPE, #0G, ¾" cap.
BROWN & SHARPE, #2, high speed
BROWN & SHARPE, #00, high speed ⅝" cap.

### PLAIN MILLERS UNIVERSAL

BROWN & SHARPE, #3B, PLAIN
BROWN & SHARPE, #3, UNIVERSAL
CINCINNATI, #2MH, Universal
VAN NORMAN #½ and #12 22LU and 36 SU Ram type
VERNON Miller, motor in base
CINCINNATI #3 plain M.D.
PRATT & WHITNEY #12B Profiler 2 sp.
LEES BRADNER Thread Miller 12"x54" HT

### VERTICAL MILLERS

CINCINNATI, #2, #4, dial type
VAN NORMAN, #3V, rapid traverse
KEARNEY & TRECKER, #3KM, dial type
KEARNEY & TRECKER, #1H, dial type
PRATT & WHITNEY Jig borers #2
MOORE Jig Borer
SWISS Jig Borer #5B Univ. Table
GORTON #8D Vertical high speed
DECKEL engraving machine model 9IL, 36-1 Ratio

### MISCELLANEOUS

Niagara 6'x10 gage, 16" gap
Baresh #2 percussion press, 60 ton
DoAll continuous handfiler Model BF

**ROW BOTTOM CAM MILLER**

THIS IS A PARTIAL LISTING—TREMENDOUS STOCK ON HAND—YOUR INQUIRIES WILL RECEIVE OUR PROMPT AND COURTEOUS ATTENTION

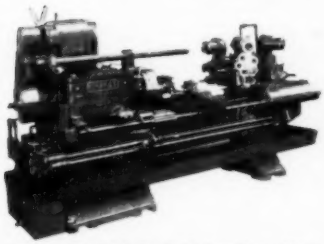
## CAPITOL MACHINERY CORPORATION

253 CENTRE STREET PHONE WO. 4-7615-6 NEW YORK 13, N. Y.

MBNA MEMBER

# Eastern For • DEPENDABILITY • SERVICE • QUALITY REBUILDING

## • LATE MODEL MACHINES • GUARANTEED EQUIPMENT



**4 No. 2F Gisholt Fastermatics, 1946 machines, practically new.**

### RADIAL DRILLS

2' Fosdick, 9" col., gear box
3' American Sensitive, cone
3'-10" Fosdick, gear box
4' American Sensitive, m.d. on arm
4'-11" Carlton, gear box, inclosed head
4'-12" Fosdick, gear box
4'-13" American, gear box
4' Niles-Bement-Pond Semi-Universal, m.d.
5' American Triple Geared, 13" col., gear box
5'-13" Cincinnati-Bickford, m.d.
5' Cincinnati-Bickford Full Universal, gear box
5' Cincinnati-Bickford Plate Hole Driller, m.d. on arm
5' Prentice Plain, m.d.
6'-15" Carlton, gear box, inclosed head
6'-15" Cincinnati-Bickford, with 7' arm, m.d.
6' Niles-Bement-Pond Semi-Universal, m.d.
6'16" Western, m.d.
7'-17" Dreses, gear box, m.d.
8'-16" American Triple Purpose, m.d. on arm
8'-19" American Triple Purpose, m.d. on arm, 1942 machine
10'-22" American Triple Purpose, m.d. on arm

### UPRIGHT DRILLS

20" Barnes All Geared, m.d., tapper
21" Cincinnati-Bickford, m.d., tapper
24" Cincinnati-Bickford, m.d.
30" Rich, H.D., m.d.
H3 Barnes Hydram, m.d.
D4 Colburn H.D., m.d.
D8 Colburn HD.,m.d.
No. 25 Foote-Burt, m.d.
No 36HO Baker, H.D., m.d.
No. 217 Baker H.D., s.p.d.

### GEAR SHAPERS

No. 6 Fellows, belt drive
No. 7, 7A Fellows, m.d.
No. 18 Fellows Gear Finishing Machine, m.d.
No 61 Fellows, belted m.d.
No. 61A Fellows, m.d., latest type
No. 64-S Fellows, m.d.
No 615A Fellows, m.d.
No. 645 Fellows, belt drive
No 72 Fellows, m.d., latest

### GEAR HOBBING MACHINES

No. 12H Gould & Eberhardt Universal, m.d.
No. 34 Brown & Sharpe, m.d.
No. 36H Gould & Eberhardt, m.d., with infeed attachment for worm gears
No. 44 Brown & Sharpe Spur & Spiral, m.d.
48" Cleveland, m.d.

### GEAR CUTTERS

No. 3—26" Heavy Brown & Sharpe, m.d.
No. 4—48" Brown & Sharpe, m.d.
Gleason Spiral Bevel Gear Rougher, s.p.
3" Gleason Straight Bevel, m.d.
8" Gleason Straight Bevel, m.d.
11" Gleason Straight Bevel, m.d.
12" Gleason Straight Bevel, m.d.
Cincinnati Gear Burnisher, m.d.
No. 1 Brown & Sharpe Spur Gear Tester
Cross Gear Tooth Rounder, m.d., 9" cap.
National Broach & Machine Co. Red Ring Gear Speeder, 10" cap.
Gleason Gear Tester for hypoid gears

### CENTERLESS GRINDERS

No. 2 Cincinnati, m.d., Filmatic Spindle, latest
No. 2 Cincinnati, m.d., older type
Long bar attachment for No. 3 Centerless
Cincinnati Valve Seat Grinder, cap. 3/8" valve stems, m.d.

### CYLINDER GRINDERS

No. 50 Heald Hydraulic, m.d., 11-18" spindle
No. 55 Heald, m.d., 15-24" spindle
No. 73 Heald Airplane Cylinder Grinder, m.d., brand new, latest type

### PLAIN CYLINDRICAL GRINDERS

No. 5—3x18" Brown & Sharpe, m.d., latest
6x18" Cincinnati Hydraulic, m.d.
6x18" Landis Type C Hydraulic, m.d., late
6x18" Landis, m.d.
6x30" Cincinnati Hydraulic, m.d.
6x32" Fitchburg Type A, m.d., late
8x18" Cincinnati Saddle Type, m.d.
8x36" Cincinnati Saddle Type, m.d.
No. 10 Brown & Sharpe Self-Contained, m.d.
No. 11 Brown & Sharpe Self-Contained, m.d.
10x24" Landis, m.d.
10x36" Cincinnati Hydraulic, m.d.
10x48" Brown & Sharpe, belt
10x72" Brown & Sharpe, belt
10x72" Landis, m.d.
12x36" Landis, m.d.
12x48" Cincinnati Plain Self-Contained, m.d.
12x48" Cincinnati, with sp line grinding attach.
12x48" Modern, belted m.d.
12x96" Landis, m.d.
14x18" Cincinnati, Self-Contained, m.d.
14x48" Cincinnati Plain Self-Contained, m.d.
14x52" Norton, motorized
16x48" Landis Type D, m.d., latest
20x120" Landis Self-Contained, m.d.
26x96" Landis Self-Contained, m.d.

### UNIVERSAL CYLINDRICAL GRINDERS

6x20" Fitchburg Hydraulic Spline & Gear Grinder, m.d., latest
12x24" Cincinnati Self-Contained, m.d., latest mechanical type
No. 2—12x30' Brown & Sharpe, belt
12x30" Landis Hydraulic, m.d., late type
12x36" Cincinnati Self-Contained, m.d.
12x36" Cincinnati, belt
12x48" Cincinnati, arranged for spline grinding
12x48" Cincinnati Hydraulic, m.d., latest type
12x48" Norton, m.d., latest
16x48" Cincinnati, belted m.d.
18x48" Cincinnati Hydraulic, m.d., latest

### INTERNAL GRINDERS

No. 16A—16" Bryant, m.d., latest
No. 16—22" Bryant, m.d., latest
No. 16RS Bryant, m.d., latest
No. 16—38" Bryant, m.d., latest
No. 6, 9, 10, 20 Bryant, belt
No. 24—21" Bryant, m.d., late
No. 24-36 Bryant, m.d., latest
No. 49 Heald Single End Borematic, m.d.
No. 70 Heald, belt
No. 72A Heald Plain, m.d.
No. 72A3 Heald Sizematic, m.d.
No. 72A3 Heald Gagematic, m.d.
No. 72AS Heald Sizematic, m.d.
No. 72AS Heald Plain, m.d.
No. 72AS Heald Plain, long bed type, m.d., latest
No. 73 Heald Airplane Cylinder, m.d., brand new, latest
No. 74 Heald, m.d.
No. 172 Heald Gap, m.d., brand new, latest type
No. 175 Heald Gap, m.d., latest
No. 649-16 Van Norman Automatic Oscillating Radius, m.d., latest
Series 5 No. 5 Bryant, m.d., latest

### PLANERS

24"x24"x6' Cincinnati, m.d., 2 heads
P10 Coulter Crank Type Shaper-Planer, 1 head, m.d.
20"x20"x5' Whitcomb-Blaisdell Planer, belted m.d., 1 head
24"x24"x10' Whitcomb-Blaisdell, 2 heads, m.d.
30"x30"x10' Gray, 2 heads, belt
30"x30"x14' Gray, 2 heads, belt
32"x32"x16' Gray, 2 heads, belt
36"x36"x10 Niles, 2 heads, belt
36"x36"x18' Niles-Bement-Pond, 2 heads, reversing, m.d.
36"x36"x20' Cincinnati, 2 heads, belt
36"x36"x20' Gray, 2 heads, belt
38"x38"x20' Gray Spiral Drive, 2 heads, belt
42"x42"x26' Gray, 2 heads, belted m.d.
48"x48"x18' Detrick & Harvey, 4 heads, reversing m.d.
48"x48"x28' Cincinnati, 4 heads, reversing m.d.
48"x48"x30' Cincinnati, 4 heads, m.d.
48"x48"x32' Niles-Bement-Pond, 4 heads, reversing m.d.
48"x48"x40' Sellers, 2 heads, reversing m.d.
62"x62"x40' Cincinnati, 4 heads, reversing m.d.
66"x60"x40' Niles-Bement-Pond, 4 heads, reversing m.d.
72"x72"x36' Niles, 4 heads, reversing m.d.
96"x72"x18' Pond, 4 heads, belted m.d.

### SAWS

6x6" Peerless Hack Saw, m.d.
6x6" Peerless Hydraulic, m.d.
6x6" Peerless Universal, m.d.
7½ H.P. Cincinnati Elec. Tool Co. Abrasive Cut-off Machine type JCAW
DeWalt Model ME 1 Abrasive Cut-off Machine, m.d.
No. 3 and 8 Nutter & Barnes Cold Saws
No. 6 Cochran Bly Cold Saw
No. 138 Espen Lucas Cold Saw, m.d.
Gustav Wagner Cold Saw, m.d.

### PRESSES

No. 20 V & O, m.d.
Ferracute Double Crank, 36" between uprights, 84 ton cap.
96"—400 ton Niles Driving Wheel Press, m.d.
Chambersburg 30 ton Hydro-Pneumatic
Metalwood B3 and B45

### SHEET METAL MACHINERY

No. 3 Hilles & Jones Plate Bending Rolls, m.d.
No. 1 Savage Nibbler, m.d., 34" throat
Gray Turret Head Metal Cutter, cap. ¼", 36" throat
No. 2 Libert Nibbler, 28" throat
Southwark Rotary Metal Cutter, 36" throat, m.d.
120" No. 100 Niagara Hvy. Prod. Folder,16 ga., m.d.

### SLOTTERS

10" Newton, cone
12" Bement-Miles, m.d.
15" Canada, m.d.
20-24" Dill, m.d.
48" Niles-Bement-Pond Geared, m.d.

### TAPPERS

No. 1 Bakewell Precision, m.d.
No. 1R Bakewell Precision, Radial, m.d., latest
No. 2 Bakewell Precision, m.d.
No. 5 Webster & Perks, belt
No. 10 Kaufman High Duty Oscillating Pneu., m.d.

### SHAPERS

18" Invicta Shaper, m.d. thru gear box, new
24" Invicta Shaper, m.d. thru gear box, new
24" Potter & Johnston, cone
32" Morton Draw-Cut, m.d., late
36" Morton Draw-Cut, m.d., late
48" stroke Heavy Duty Morton H.D. Traveling Head Draw-Cut Shaper, m.d., with d.c. variable voltage equipment, 12' bed, latest type

### MISCELLANEOUS

Gisholt Precision Balancing Machine, m.d.
96" Ohio Extra Heavy Worm Feed Revolving Table, m.d.
40" Tolhurst Chip Wringer, m.d.
Detrick & Harvey 2 spindle Profiler
No. 12M Morey 2 spindle Profiler, latest
No. 12 Pratt & Whitney 2 spindle Profiler, m.d.
No. 20 PH A.D. Cook Deepwell Pump with Chrysler Engine and 200' of 8" pipe, brand new
Wagner Saw Sharpener, m.d.

***We carry an average stock of 2,000 machines in our 11 acre plant at Cincinnati. Let us quote on your requirements.***

**THE EASTERN MACHINERY COMPANY**
1004 Tennessee Avenue, Cincinnati 29, Ohio — MElrose 1741 — CABLE ADDRESS EMCO

# MAKE YOUR SAVINGS Here!

### MILLERS (Pl. & Prd.)

Cinn. #3 Dial Type Hi-Speed, attchmts.
B & S #2 light type, attchmts.
B & S #3B Dbl. Overarm, motor-in-base
B & S #12 Automatic (late)

### (Universal)

B & S #2 Light Type, attchmts.
Van Norman #2SU rect. overarm, attchmts. (late)
Van Norman #368U Ram Type, attchmts. (late)
Van Norman #22 ram Type Slotting, attchmts. (late)
Cinn. #3B Rect. Over., motor-in-base, attchmts.
B & S #3A motor-in-base, attchmts.

Gorton #9J and 6½D Duplicators, collets, cabinet & Misc. tooling

### (Vertical)

P & W #1-½-B Jig Borer attchmts.
B & S #2 Light Type
K & T (Milw) #2K Hi-Speed
Cinn. #3 Dial type, mod. speed.
Cinn. #1M & 2M Pyramid Col., Motor-in-base

### LATHES

Hendey 12"x30" gr. hd., Timken bearing
P. W. 16"x36" model-B
Reed-Prentice 16"x8' model-B 54" C.D.
Hendey 14"x6' E.C.M., 18-speed
Hendey 20"x12' Gr. Hd. 7'10" C.D.
American 30"x16' Gr. Hd. Hi-Duty, 8' c.dist.
American 30"x25' Gr. Hd. Hi-Duty, 15' c.dist.
Lodge & Shipley 36"x16' Gr. Hd., 8'6" c.Dist.

Bridgeford 36"x56' Gr Hd., 48' c.dist.
Niles-Bement-Pond 48"x24" Gr. Hd., 15' c.dist.

Lipe Rollway 12"x18" Carbo. Semi-Auto. (late)
Sundstrand #8—15"—#10—22" Auto. Stub (late)

### TURRET LATHES

W. & S. #2A Pre-selec. hd., saddle type (late) tooling
J. & L. #5 Ram Type, 3" hole
B. & O. #3 Univ. 1¾" hole
Gisholt #5 Pre-Selec. hd., Univ., Chucking

### GRINDERS

B & S #13 Universal & Tool (late)
Cinn. #2 Cutter and Tool (late)
Gorton Tool & Cutter
B & S #1, 2, 3, 4 Univ. Cylinder.
Cinn. 12"x36" Film. Bearing, Hydraulic Univ.
Norton 10"x18" & 10"x36" Type-C Pl. Mech. (late)
Thomson BB 12"x14"x24" Auto. Surface (late)
Gallmeyer & Livingston #25 6'x18", #45 12"x24", & #5 12"x36" Hydraulic Surface
Abrasive #3 22"x22
Abrasive #2 22"x8"x12" Auto. Surface
Blanchard #11 Rotary surface, 16" chuck
Blanchard #16-A Rotary Surface, 30" chuck
Cinn. #2 Centerless Film. Bearing
Cinn. #3 Centerless 20-HP M.D.

### BORING MILLS

Universal 4" bar "Triway" Table Type, 12" extra vertical range (late)
Defiance #25A, 3½" bar Table Type, added vertical & cross range (late)
Yoder 3A, 3" bar Table Type (late)
Bullard 24" & 36" "Spiral Drive" & "New Era" types

### PRESSES

Toledo #50 250-ton, 18" stroke, St. Sided, four posted, dbl. gr., 4 pt. tie rod constr.
Farquhar 100-ton 36" stroke Hydraulic (late)
Robertson 300-ton 4-posted hydraulic Hobbing.
Billings & Spencer #2 Trimming Press, side shear, M.D.
Bliss #73½ Trimming, 3" stroke, M.D.

### PLASTIC INJECTION MOLDING MACHINES

NEW—York 4-oz. Injection Molding Mach., 20,000 P.S.I., injection pressure 55# cap. per hr., complete with pyrometer controls.

9-oz. H.P.M., 2-zone Wheelco Pyrometer
4-oz. H.P.M., 1-zone Brown Pyrometer
10-A-2, 2-oz. Reed-Prentice, 1 zone pyrometer.
10-D-6, 6-oz. Reed-Prentice, 2-zone Foxboro pyrometer
6-oz. Watson-Stillman, 3-zone Wheelco Pyrometer.

### PLANLERS, HAMMERS & FORGING MACHINES

Cinn. 78"x56"x22" Dbl. Housing, 4 hds., M.D.
Woodward-Powell 48"x48"x14' Dbl. Housing, 4 hds., Rev. M.D.
Chambersburg 2500 & 4000# Board Drop
Standard 1200# Board Drop, 1943
United 2000# Board Drop
National 3", 5" & 7½" Upset Forging Mch.

### MISCELLANEOUS

Potter & Johnston #GDRE Auto. Chuckers, Timken Bear.
3—New Britain #8B—1" Auto. Screw, tooling

NEW—Rafter Power Squaring Shears
—2 sizes—immediate delivery
¼"x10' mild steel
⅛"x10' Stainless Steel
3/16"x12' Mild Steel
3.32"x12' Stainless Steel

Bliss 2-high, 10" Cold Rolling Mill, extra set rolls
Keller type (P & W) BL-2416 Semi-Auto., 3 dimensional duplicator
National Acme RA 9-16" 6-spindle (late)
New Britain #61, 2¼" Automatic (late)

*This is only a partial listing — for complete information — write, wire or phone (WOrcester 6-5175)*

**Botwinik Brothers of Mass., Inc.**
3 SHERMAN ST. • WORCESTER 1, MASS.

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### AUTOMATICS

No. 18 New Britain 6 spdl. chucking
No. 454 New Britain chucking
14"x19" Fay Chucking
8" Bullard 6 spindle Mult-Au-Matic
½", No. 0G Brown & Sharpe
⅝" Acme Gridley Model R6
⅞" & 1¼" Cone 4 spindle
1" Economy shaver, hopper feed
1⅛" Cleveland 4 spindle
1⅝" New Britain, Model 61
1⅞" Conomatic 8 spindle
2"x18" Cleveland Model B
2⅝" Acme Gridley Model RA6

### BORING MILLS

100" Niles Bement Pond vertical
52" King vertical
24", 30" & 42" Bullard vertical
2½" bar, No. 25 Giddings & Lewis
3" bar, No. 3A Universal
3" bar, No. 31 Lucas
3¾" bar, No. 5A Defiance
3¾" bar, No. 32 Lucas
5" bar Jones, planer table type
Nos. 112B & 2112 Excello precision
Nos. 42, 47A & 48A Heald Boremastic

### GRINDERS

Nos. 1 & 2 Brown & Sharpe univ.
10"x24" Landis hydr. universal
No. 2 Norton univ. tool & cutter
26", No. 226 Gardner disc
53", No. 372 Besly horiz. disc
No. 115 Gardner opposed disc
No. 230 Hanchett opposed disc
No. 2 Cincinnati centerless
No. 510 Oliver drill grinder
Nos. 6G & 10G Sellers drill grinders
Norton, 6"x18", 10"x36" & 23"x36"
Landis 6"x18", 14"x36"
No. 2B Brown & Sharpe surface
12"x48" Thompson surface
14"x60" Mattison surface
No. 34 Abrasive surface
16" & 24", No. 25A Heald surface
12" & 16", No. 22 Heald surface
Nos. 72A3, 72A5, 74 Heald internal
No. 72A3 Heald Sizematic
No. 72A3 Heald Sizematic centerless
Nos. 16A16, 16-28, 16-38 & 24-36 Bryant

### LATHES

36"x16' Bridgeford
25"x48" centers Leblond
20"x8' Lodge & Shipley
18"x8' Rockford
16"x8' Porter McLeod
16"x30" centers Monarch
16"x5' Sebastian
14"x6' Lodge & Shipley

### LATHES, TURRET

Nos. 2, 3, 4, 5, 1A & 3A Warner & Swasey
Nos. 5 & 7 Bardons & Oliver
Nos. 3, 4 & 3AL Gisholt
24" & 42" Bullard vertical
No. 62 Denver
No. 4 Midland
Nos. 2G & 3 Morey
3"x36" & 4"x34" Jones & Lamson

### SHAPERS & PLANERS

6" Pratt & Whitney vert. shaper
16" Bement Miles slotter
16", 20", 24" & 28" G6E shapers
20" & 24" Gemco univ. shapers
24" Columbia univ. shaper
30"x24"x6' Liberty openside planer

### SHEET METAL TOOLS

8'x¼" Cincinnati press brake
8' x 10 ga. Dreis & Krump leaf brake
10' x 14 ga. Dreis & Krump leaf brake
8' x 10 ga. Beloit bending roll
No. 202½ V. & O. thread roller
72" x 14 ga. Wysong & Miles shear
60", 14 ga. Pettingell rotary shear
Nos. P1, P2, P3, P4, P5 Ferracute presses
Nos. 18 & 19 Bliss OBI presses
No. 6 American Can OBI press

**MILES MACHINERY CO.**
**SAGINAW, MICH.**

---

National Bent Shank Nut Tappers Battery of ⅝" to 1" Machines.
Waterbury-Farrel Fdry. ⅝" and 1" D.S. S.D. Cold Headers, also Thread Rollers.
Fisher 5" Bar, Floor Type Boring Mill. New in 1942.
Niles, Bement, Pond 60"x60"x24' table 4-Head Planer, Rev. D.C. M.D.
Bliss Presses in all sizes up to 1,000 ton capacity.
Wire Working Machinery.

**National Machinery Exchange**
**128-138 Mott St., New York 13, N. Y.**

---

## EQUAL TO NEW

PEXTO Model G-3120 Gap Shear 10'-10-ga.

DUAL All Steel Press Brake Model 40-10, 10'-14-ga.

BLAKESLEE Degreaser Type D-85-P

REX Spot Welder 40 KVA

**HAZARD BROWNELL MACHINE TOOLS, INC.**
**350 Waterman St., Providence, R.I.**

# LATE TYPE MACHINERY AT OLD TIME PRICES

### AUTOMATICS

Brown & Sharpe #00B, H.S. (8) #4, #6
Conomatic 8 sp. 1¼" cap.
New Britain Gridley 6I—6 Sp. 2¼"

### BORING MILLS

Giddings & Lewis #6, #25T
Lucas #31 horiz.
Universal 3" horiz.
Bullard 24", 42" New Era V.T.L.

### DRILLS AND RADIALS

Barnes #262, Buffalo 18", 1" capacity
Cinci-Bickford Super Service, 21", 24".
Delta Bench & Floor Models single & 4 spindle
Royersford Excelsior 21" Back Geared, P.F.
Sibley 24—28" Latest
Nates Model E-5 Multi-Spindle, 14 spindles
American Hole Wizard 3'-9" col., Amer. 4'-13" col.
Canedy-Otto 3'-9" col.
Carlton 8'-19" col.

### ENGRAVERS

Gorton #3U, 3Z 2 dimensional; #3L, 3 dimensional
Gorton Cutter Grinders 375-2, 265-5

### GEAR EQUIPMENT

Fellows #72, 725 High Speed
Mikron Gear Hobber
National Broach Checker; Michigan Gleason

### GRINDERS—Miscellaneous

Brown & Sharpe #5 cyl., 3"x18"
Brown & Sharpe #2, #3 Univ., #13 Univ. & Tool
Cincinnati #2 Centerless Filmatic, 12"x36, 12x48" Univ.
Covel #91A Univ. Tool & Cutter
Excello #44 Carbide, Hammond #4
Gardner #220, 30 disc, Heald #1 Tool
K.O. Lee Tool & Cutter
Landis #4H Cyl. 4x12", Landis #6 Thread & Centerless
Norton #2 Tool & Cutter
Norton Cyl. 6x18" Type C, 6x30" Type C
Oliver #510 Drill Pointer, Sellers #46
Pratt & Whitney Radius #R6
Black Diamond #1 Drill
Porter Cable Belt W68, G6

### GRINDERS—Surface

Abrasive #1½" Wet Hand Feed, #34 Vertical
Atlantic 6x18" Power Feed
Brown & Sharpe #2, #5 Hyd. 8x24" Cap.
G. & L. #18, 6x18" Hand Feed, #25, #35 Hyd.
Hanchett #300, 13x48"
Mattison 14x10x48" Hyd.
Norton 6x19" Hyd.
Reid #2A P.F., #2C Pope Spdl Hand
Pratt & Whitney 12x36" Vert.
Thompson Hyd. 6x10x18", 6x12x18

### LATHES

Hardinge Precision 9", cabinet
Hendey G.H. 12x30", 16x30
LeBlond Regal 10"x3½", 13x30", 19x42", 21x60"
LeBlond Heavy Duty 16x33"
Lodge & Shipley 10x78" T.A.
Monarch 10"x20" EE, 10x78" T.A., 12x30"
Rivett Precision, Logan 10"x30"
Sebastian 12"x4' G.H., Sheldon 11x24", 1" collet
South Bend 9"x3', 9"x3½", 13x36", 16"x7'
South Bend 10" Toolroom 1" collet capacity, T.A.

### LATHES—Turret

Acme #6W Bar & Chuck, 6W Fox Lathe
Bardons & Oliver #3, #5, Foster #3B
Brown & Sharpe #1, 2F Hand Screw Mach.
Gisholt #4, 8 Bar & Chuck
Hardinge ESM Second Operation
Jones & Lamson #8A Univ. Saddle Type
Oster #60i Rapidaction, Morey #3, 1½" cap.
Warner & Swasey #3 Universal, #4 Pre-Selector, #4A

### MILLS—Plain & Universal

Brown & Sharpe #2 Pl., #2A Univ.
Burke #4 Plain & Univ., Vert. Hds.
Cincinnati #3 Plain, 2MH Univ.
Milwaukee #2HL, 2H, 3H Plain
Milwaukee #2HL, 2H, 3H Univ.
Van Norman #12, 20, 22L, 36

### MILLS—Vertical

Bridgeport vertical with Slotting Attach.
Brown & Sharpe #2
Cincinnati #4 Dial Type
Kearney & Trecker #5H
Gorton #8D, 9J Plain
Gorton #8½D Duplicator Fully Equipped
Fosdick Jig Borer #42 Like New
Sip Jig Borer #MP-5
Morey #12M Profiler 2 sp.—Pratt & Whitney 12B

### MILLS—Production

Brown & Sharpe #000, 12, 21
Cincinnati #1-12, 2-18 Mig.
Kent Owens #1V, 2-20
Nichols Hand, Vert. Hd., U.S. MM 1
Sundstrand #00, U. S. Duplex

### PRESSES

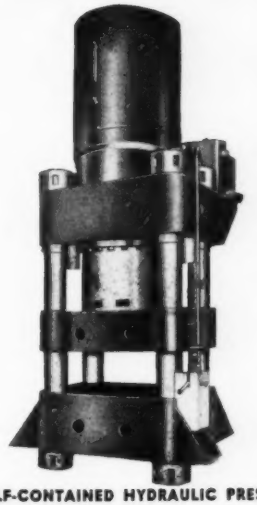
Bliss #8 Dbl. Crank, Bed 42x100", 250 Ton
Bliss #675 Hi-Production, 100 Ton
Bliss #20, 21 O.B.I., #4½ Double Action Cam
Bliss #58 O.B. Gap Frame #62, 62A, 162 BS
General Flexible Elec. Screw
Henry & Wright 25, 60, 75 Ton Dialog
Thomas 80 Ton O.B.I., Diamond #31 O.B.I.
Toledo 400 Ton Knuckle Joint #085
V. & O. #25S O.B.I., #102 Reducing
Z & H 30 Ton O.B.I.

### MISCELLANEOUS

BAND SAW: DoAll Metalmaster, Tannewitz #36M
BENDING ROLL: Buffalo #0, ½, Excelsior #14
BROACH: 3L LaPointe Horiz. Hydr.
FILER: Oliver, HEAVY DUTY
HACKSAW: Marvel #6A Automatic, #6, #4B
HARDNESS TESTER: Roskwell 4JR, Clark
HAMMER: Niles Bement Pond 2500 lbs. steam
HAMMERS: Rochester Rivetting, Hi Speed
HONER: Micromatic #H-1 Hydrohoner
INJECTION MOLDER: Reed-Prentice #10D6, 6 ounce

### NEW IN STOCK

Air Hydraulic Presses—Arbor Presses #6C Famco, ½ off list price—Band Saws Kalamazoo 8x16", 8x24"—Drill Presses all sizes—Grinder Surface, Abrasive #1½—Hydraulic Press Northern 20 Ton—Injection Molders, 1 ounce—Power Presses, Famco 4½, 7½ Ton, Rousselle O.B.I. & Horn 5, 10, 15, 25 Ton, Pressrite OBI, 5, 10, 12, 18, 30 ton cap.—Shaper, 7" Ammco, 8" Shaprite, Sheldon 12"—Shears, Foot 22" to 8', 16 & 18 ga., Shears, Power, 3'x18 gauge to 10x10 ga.—Welders, Arc Seam, Spot all sizes—Vert. Milling Attach. Haloo, HS 5 & 10 Speed—Motors, Grinders, Buffers, all sizes.



SELF-CONTAINED HYDRAULIC PRESS

### HYDRAULIC EQUIPMENT

| Cap. | Manufacturer | Platen | Stroke | Opening |
|---|---|---|---|---|
| 500 Ton | Lake Erie | 35x36" | 36" | 60" |
| 600 | Bald. S'thw'k | 76x59" | 22" | 30" |
| 500 D.A. | H.P.M. (160 Cushion) | 36x36" | 24" | 30" |
| 1000 | French Oil | 53x42" | 20" | 30" |
| 300 | Brand New Watson Stillman Hobbing Press | | | |
| 375 D.A. | Elmes (60 Cushion) | 84x44" | 12" | 42" |
| 350 | Verson | 48x48 | 30" | 72" |
| 50 | Dennison | 22x20 | 18 | 23 |
| 150 | Southwark | 34x30 | 30 2' to 4' | |

### UP MOVING RAM PRESSES

50 & 100 Ton Stokes Molding Presses & Pumps
300 Ton Dunning & Boschert Molding Press
500, 800 Ton Waterbury-Farrel 3 & 4 Rod Presses, 6 & 6½" strokes
300 Ton Watson Stillman Press, 24x20" Platens
400 & 500 Ton Shaft Straightener—Self Contained

*All Hydraulic Equipment is completely engineered and checked by a competent staff, thus assuring reliability. Send us your Hydraulic problems.*

IRONWORKER: Buffalo 25U x 20 Univ.
KEYSEATER: Davis #4, Mitts & Merrill, Baker
PLASTIC GRINDER: Bell & Jewel, Cumberland
PRESS BRAKE: #253, #335 Chicago, 8L10
ROUTER: Onsrud #W240, #55 Oliver
SHAPER: 8" Shaprite, Ammco, Atlas
SHEAR: Pexto, 9'x14 Ga. Power
SHEAR THROATLESS: #138 Lenox
SPEED LATHES: Cincinnati, Schauer
TAPPERS: Bakewell #1, Haskins #2C, 3C
THREAD ROLLER: Waterbury-Farrel #30 with Dies
WELDERS: Seam; Thompson
WELDERS SPOT: Taylor-Winfield 50 KVA, Selsky
WRAPPING ROLL: Buffalo #½

*THIS IS ONLY A PARTIAL LISTING. WHY NOT SEND US YOUR INQUIRIES*

*WRITE FOR OUR FREE ILLUSTRATED CATALOG*

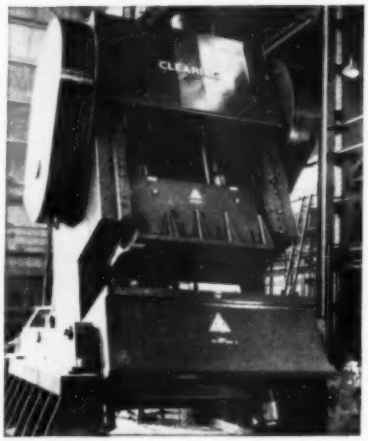
AARON MACHINERY CO., Inc.

45 Crosby Street
WOrth 4-8233

New York 12, N. Y.
Cable: AARMACH, N. Y.

MDNA MEMBER

# SPECIAL OFFERING



★ Three *new* 500-ton G-1084 Clearing Single Action D.C., Gap Frame, tie-rod construction, Inclinable Presses for sale, complete with electrical equipment.

Two of these presses have 18″ stroke; crankshafts 10″ and 15″. Distance between frames—86″. Adjustment of slide—12″. Area of slide F to B x R to L is 48″ x 84″. Area of bed F to B x R to L—48″ x 120″. Bed opening—33″ x 69″; shut height 40″. Strokes per minute—16. Weight approximately 100,000 pounds. (One of these is still at manufacturer's plant waiting shipment.)

The third press is same as above, except with 26″ stroke. Weight approximately 120,000 pounds.

Offered as is, where is, F.O.B. cars, subject to prior sale or withdrawal.

★ **Arrangements for inspection can be made by contacting Mr. J. G. Schramm, Purchasing Engineering Department, Equipment Sales Division, Ford Motor Company, 3000 Schaefer Road, phone OREgon 4600, extension 7686.**

**FORD MOTOR COMPANY**
**DEARBORN, MICHIGAN**

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# DALEY & SIBLEY

**can supply you with**

## HARD-TO-FIND ITEMS

**SAMPLES:**

1. #2 CINCINNATI HIGH SPEED DIAL TYPE VERTICAL MILLER WITH ROTARY TABLE. late type.
2. #3 CINCINNATI UNIVERSAL DIAL TYPE MILLER COMPLETE WITH STANDARD EQUIPMENT.
3. #2 CINCINNATI CENTERLESS GRINDER. WITH IN AND OUT FEEDS. FILMATIC BEARINGS. late type.
4. #4D POTTER & JOHNSTON AUTOMATIC CHUCKING MACHINE. 1941. late type.
5. HANSON & WHITNEY THREAD MILLER. 8 x 16. late type.
6. #736 NIAGARA POWER SQUARING SHEAR. 3/16″ x 36″.
7. 16″ x 30″ HENDEY GEARED HEAD LATHE. HIGH SPEED.
8. #13 BROWN & SHARPE UNIVERSAL AND TOOL GRINDING MACHINE.
9. #12 MARTIN HYDRAULIC MARKING MACHINE—late type.
10. #4 & #5 GISHOLT UNIV. TURRET LATHES. LATE TYPES. WITH EQUIPMENT.
11. 3/16″ HI-PRO HI SPEED W.F. F. D.S.S.D. HEADER.
12. 16″, 20″, 24″ GOULD & EBERHARDT AND AMERICAN SHAPERS.

**DALEY & SIBLEY**
**Dependable Service**

**417 CHAPEL STREET** **NEW HAVEN 5, CONN.**

---

# NEW SURPLUS

**HIGH SPEED TAPS**

**$.60 each or**

**$7.00 per dozen**

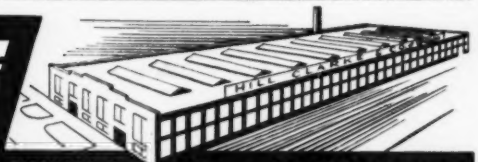
SIZES

3/48, 1/56, 4/36, 4/40, 4/48, 5/40, 5/44, 6/32, 6/40, 8/32, 8/36, 10/24, 10/32, 12/24, 12/28, 14/20, 14/24.

1/4″-20, 1/4″-28, 5/16″-18, 5/16″-24, 3/8″-16, 3/8″-24, 7/16″-14, 7/16″-20.

**VICTOR MACHINERY EXCHANGE, INC.**
**251 CENTRE STREET**
**NEW YORK 13, N. Y.**
**CANAL 6-5575**

# HILL-CLARKE MACHINERY COMPANY



ESTABLISHED 1867 • H. W. MONS, President • W. L. DITFURTH, Vice-President • T. H. PRICE, Secretary

**UNION SPECIAL MACHINE CO.**, largest industrial sewing machine manufacturer, has Hill-Clarke machines still in use after 33 years. J. V. CARLSON, Chief Factory Supt. says "We find Hill-Clarke the most reliable dealer in used machinery because of their years of experience plus their superior facilities for accurately rebuilding machine tools".

## FOR YOUR PROTECTION only Hill-Clarke offers THIS 5 WAY GUARANTEE

1. A responsible organization—82 years experience.
2. A 58,000 sq. ft. plant equipped with complete and modern facilities plus experienced craftsmen for remanufacturing machine tools.
3. Modern machines—no worn out equipment.
4. You can see your machine tested under power before purchasing.
5. Hill-Clarke's unconditional money-back guarantee.

### AUTOMATICS

No. 2 Brown and Sharpe
1⅝" Greenlee, 6 Spdls. (1941)
No. 61 New Britain 6 Spdls. 1⅝" (1942)
No. 6 Brown & Sharpe
No. 49 New Britain, 4 Spdl. chucker (1942)
Model A 2½ Cleveland
Model A 3¾" Cleveland

### DRILLS

No. 150 Baker
No. D8 Colburn No. 6 Morse Taper
No. 1LMS—20"—5 Spdl. Leland-Gifford
No. 2LMS—26"—1 Spdl. Leland-Gifford
No. 2LMS—14"—3 Spdl. Leland-Gifford
No. 2LMS—26"—4 Spdl. Leland-Gifford
No. 2LMS—28"—6 Spdl. Leland-Gifford
No. 4BL Natco 36 Spdls.
6'-17" Col. Fosdick Radial
7'-15" Col. American Full Universal

### GEAR MACHINES

No. 61 Fellows Gear Shaper (1941)
No. 61-A Fellows Gear Shaper (1942)
No. 7125 Fellows (1943)
No. 712 Fellows Auto Indexing (1943)
No. 72 Fellows Gear Shaper (1942)
No. 16 HS Gould & Eberhardt
No. 18H Gould & Eberhardt
No. 6 Gleason Gear Tester
12" Gleason Bevel Gear Cutter
72" Cincinnati Gear Cutter

### HORIZONTAL BORING MILLS

No. 31 Lucas 3" bar
No. 46-B Heald Bore-Matic
No. 112—C Excello 2 Spdl.

### GRINDERS

3"x12" Brown & Sharpe No. 5 (1944)
4"x12" Landis, Model H (1942)
6"x18" Norton Type C Plain (1943)
6"x30" Norton Type C Plain (1943)
10"x18" Norton Type C Plain (1943)
10"—14"x36" Norton Type C Plain (1942)
10"x48" Norton Type C Plain (1943)
Norton Motorized Grinders ranging from 6"x18" to 24"x240"

No. 5—8"x24" Covel Hydr. Surf. (1941)
No. 36-A Hanchett Rotary Surface (1942)

72A-3 Heald Internal Grinder (1942)
72A-5 Heald Internal Grinder (1942)
74 Heald Internal Gdr. (1942)
No. 5 Bryant Internal Grinder (1942)
No. 16-16 Bryant Internal Gdr. (1942)
No. 16-38 Bryant Internal Grinder (1942)
No. 24-26 Bryant Internal Grinder (1941)

### LATHES

15"x5' Sebastian, Grd. Head
16"x54" centers LeBlond (1941)
16" x 60" centers Pratt & Whitney.
18"x6' American, Grd. Head
19"-38" gap x 10' LeBlond
36"x30' Lodge & Shipley
36"—48"x18' Lehman Hydratrol (1945)
48"x20' centers Simmons (1942)
50"x17' centers LeBlond (1942)

### LATHES (Production)

8"x15" Sundstrand, Model D (1943)
10"x16" Sundstrand Model D (1942)
10"x22" Sundstrand, Model AA (1943)
16"x32" Fay Automatic (1942)
20"x25" Fay Automatics (1942)
R—14 Seneca Falls Lo-Swing

### MILLING MACHINES

No. 4 Cincinnati Plain (1943)
No. 2 Cincinnati Vert. (1942)
No. 2M Cincinnati Vert. (1941)
No. 3 Cincinnati H.P. Vertical
No. 1-18 Cinn. Mfg. (1940)
No. 2—18" Sundstrand-Electromil (1942)
No. M-24 Milwaukee Simplex (1943)
38"x40"x10' Fitchburg Duplex Miller (1943)
No. 4-48 Cincinnati Hyd. Tracer (1942)
No. 34-48 Cincinnati Hyd. Duplex
No. 45-48 Cinn. Hyd. Plain Tracer (1942)
No. 46-72 Cincinnati Plain Hyd. (1942)
No. 56-72 Cincinnati Plain Hyd. (1941)
4"x9" Hanson-Whitney Univ. Thrd. Miller
4½"x12" Pratt & Whitney, Model C
6"x36" Lees-Bradner—Model HT (1943)
6"x48" Pratt & Whitney Thrd. Miller
6"x80" Pratt & Whitney Thread Miller
6"x132" Pratt & Whitney Thread Miller
6"x168" Pratt & Whitney Thread Miller
10"x48" Hanson-Whitney Thread Miller
24"x24"x12' Ingersoll Adj. Rail
36"x36"x16' Ingersoll Slab Miller
No. 10 Ingersoll 72"x6" Traveling Col. Face Millers (1942)

### MISCELLANEOUS

18" Dill Slotter
Model H-7 Micromatic Hydro Honer (1943)
Model H-2 Micromatic Hydro Honer (1944)
Model 200 Micromatic Hydro Honer (1943)
8-M Wells Band Saw
Model H-100 Micromatic Hydro Honer (1942)
Model 200—H5 Micromatic Horiz. Hone. (1943)
No. 2 V & O open back press
Baush Radial Tapper (1942)

### PLANERS

36"x36"x12' Cincinnati
36"x36"x18' Gray, 4 Heads
48"x36"x14' Gray
48"x48"x12' Cincinnati, 4 Heads

### TURRET LATHES

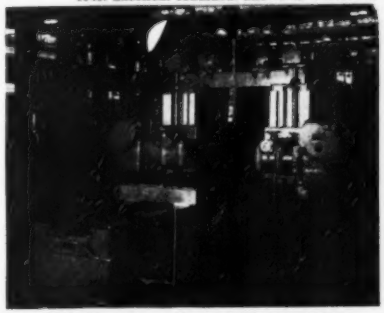
No. 4 Gisholt Universal Turret Lathe (1942)
No. 4R Libby, Bar Feed (1942)
No. H-5 Libby (1942)
No. 5 Bardons & Olivers (1942)
No. 5 Midland, Bar Feed (1942)
No. 2-A Warner & Swasey
No. 1-H Libby, 6¼ Hole in Spindle
No. 1-H Libby, Extra Long Bed (1942)
18" Libby, 3⅛" Hole in Spindle
No. 4A Warner & Swasey, 7½" Hole in Spindle

### VERTICAL BORING MILLS

42" Bullard New Era
42" Colburn
60" Colburn
72" Niles Extra Heavy
84" Betts

## FEATURE OF THE MONTH

For handling large milling work 38"x40"x10' Fitchburg Duplex Milling Machine. New in 1943. Excellent condition. Shown in our Plant.



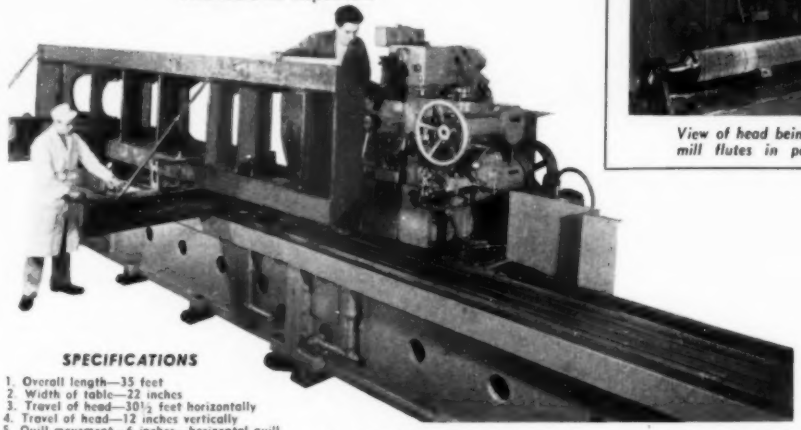
*Ask for Our New GREEN LIST*

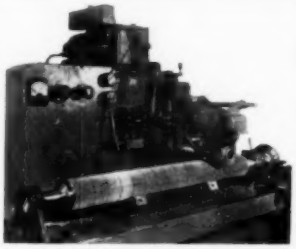
Write, Wire or Phone **HILL-CLARKE MACHINERY COMPANY**
651 WASHINGTON BOULEVARD, CHICAGO 6, ILL. PHONE CEntral 6-0500

## *For Sale!*

# 4 INGERSOLL MILLING MACHINES

3 horizontal, 1 vertical—all in excellent condition.
Available for inspection.





*View of head being used to mill flutes in paper roll.*

**SPECIFICATIONS**

1. Overall length—35 feet
2. Width of table—22 inches
3. Travel of head—30½ feet horizontally
4. Travel of head—12 inches vertically
5. Quill movement—6 inches—horizontal quill
6. Spindle speeds—350 to 1217 RPM—rheostat adjustment
7. Head travel 5" to 40" per min.—200" per min. rapid traverse
8. Power—250 Volt D.C. Spindle motor is 15 HP. Feed Motor is 5 HP. Machine is equipped complete with all electric motors, contractors and controls.
9. Machine is equipped with a hydraulic cam follower device for contour milling.
10. Machine is equipped with leveling jacks.
11. Weight—52,000# (approx.)

**COMMERCIAL SURPLUS SALES CO.**

**4101 CURTIS AVE., CURTIS BAY, BALTIMORE 26, MD., TELEPHONE: CURTIS 3300**



## UNUSUAL VALUES

**Milling Machines**—No. 1, Universal, No. 1 American (new) plain, No. 1 Vertical.

**Drills**—Large selection, single and multiple spindles also bench types, many of them new.

**Gear Cutters**—Brown & Sharpe No. 3—26" Gould & Eberhardt 42".

**Grinders**—Cylindrical B. & S. No. 11, Planer type 16"x36", Surface 12"x52", also new (small) Universal bench and floor type. All with coolant, motorized.

**Lathes**—14"x6', 8', 10'—16"x6', 8', 10'—18"x6', 8', 10'—26"x10'—all cone drive, several motor-timed also (new) 18"x8' and 10' geared head, motorized.
Large stock 19" and 13" bench and floor type.

**Planers**—Single head 24"x6', 24"x8', 26"x8'.

**Shapers**—16", 20", 24", B.G. crank.

**Turret Lathes**—J & L 2"x24"—3"x36" also Acme, W & S Turret (vertical) boring and facing mills, 5 hole turrets, 30", 40".

**SPECIAL**—New totally enclosed dust proof, fan cooled, ball bearing saw arbor motors, plain shafts to size or threaded, and with collars, measures only 3¼" from center of shaft to flatted top (1 h.p. to 15 h.p.) 2 or 3 phase, 3600 r.p.m.

**WOOD WORKING MACHINERY**—A very large stock of new and re-built, practically all motorized. New Motorized overhead cut-off and miter saw for wood, plastics, steel, aluminum and other metals. The above list is only a fraction of our stock which changes almost daily, therefore, tell us definitely what you want since we are adding considerable number of machines to our stock which are too many to list. What we have today may be sold tomorrow, so a list is really not dependable.

**Drill**—Foote-Burt No. 25 24" Hi Duty 2" capacity in steel. Motor attached.

**PATTERN MAKING MACHINERY**—42"x16' bed wood lathe, compound rest, rack and pinion feed to carriage; 16" heavy duty jointer, extra long bed, front table tilts for giving draft to pattern work; tilting table also tilting arbor rip and cut-off saws; band saws; jointer; floor and bench type trimmers; and also many other machines for pattern work.

**THE OSBORNE & SEXTON MACHINERY CO.**

**P. O. Box 88, Columbus 16, Ohio**



## LATE DIE SHOP TOOLS

28-60 Cinci. Hydrotel, one spin., 1943
BL2416 Keller 3 spin. Duplicator, table 22"x42", 3 dimensional
Model 9J Gorton Electric Duplicator, 3 dimensional
Model 9J Gorton Vert. Miller, power feed to head
Bridgeport Vert. Miller, power feed, shaping attach.
(2) Bridgeport Vert. Millers
Indexing Vert. Miller
#3K K. & T. Plain Miller, with vert. attach.
3' 9" col. American Hole Wizard Radial, 1943
#45 G. & L. Surface Grinder, 12"x24", 1942
16" G. & E. Tool Room Shaper, 1943
#2 B. & S. Surface Grinder, 1943
Cinci. Monoset Grinder
(2) 9" Hardinge Bench Lathes
24" Foote-Burt Drill, #2 M. T.

**BENNETT MACHINERY CO.**

**30 Church St., New York 7, N. Y.**



## POWER PRESSES

BLISS, TOLEDO, V & O, ETC.
REBUILT – GUARANTEED

MONA steels

**JOSEPH HYMAN & SONS**

Tioga, Livingston and Almond Streets
Philadelphia, Pa.



## LATE MODELS MACHINE TOOLS

30"x38' LEHMANN "Hydrotol" Geared Head Lathe.

50"x17' centers LeBLOND "Big Swing" Geared Head Lathe.

Several CINCINNATI and K&T Millers, all types.

No. 174 HEALD Gap Grinder.

No. 16-28 BRYANT Gap Grinder.

Nos. 11 & 18 BLANCHARD Grinders

3" & 4½" bar UNIVERSAL Hor. Boring Mills

3' 11" AMERICAN & MORRIS Radial Drills.

4½" x 36" P&W Thread Miller

**Wigglesworth Machinery Co.**

**197 Bent St. Cambridge, Mass.**

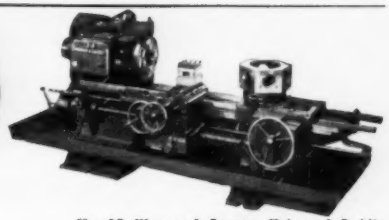


Metal Forming and Bending Machine
#206-F Toledo 155 Ton D.C. Press, 3" Stroke, 20" x 110" Bed Area
¼" x 144" Dreis & Krump Squaring Shear
Roller Type Slab Miller 22" Slab capacity
12 Spindle Moline Automatic Drilling Machine
3 spindle Moline Model 7-D Cylinder Borer
1-A W&S Universal Turret Lathe
36" x 14' Schumacher & Boye Engine Lathe
Libby 26" x 4½" spindle Turret Lathe
26" Stockbridge Shaper
Lees-Bradner CT 36" Thread Millers
10" x 40" Roll Grinder
300' Air Compressor, Ingersoll Rand, 50 HP Motor Drive.

**CONTINENTAL SALVAGE & MACHINERY CORPORATION**

1838 EUCLID AVENUE, CLEVELAND 15, OHIO
MAIN 4032

# LATE TYPE MACHINE TOOLS



No. 3A Warner & Swasey Universal Saddle Type Turret Lathe with bar feed and tooling. New 1943.

### AUTOMATICS

6" RPA-8 Acme Gridley Chucker. Latest.
16" Bullard Mult-Au-Matic, 6 spdl. 1942.
6" Gess & DeLeeuw Chucker, 8 spdl. 1943.
1⅝" Greenlee, 6 spindle. 1942.
No. 1½ B-18 Cleveland. 1940.
No. 60 New Britain, 6 spdl. 1" cap. 1942.
9/16" RA-6 National Acme. 1942.
9/16" RA-6 Acme Gridley Chucker. 1942.
Model 3-8 Ceco, ⅜" cap. Late.

### BORING MACHINES

No. 42 Lucas Horiz. 4" bar. 1940.
Yoder Horiz. Boring Mill 3" bar. 1942.
No. 46B Heald "Bore-Matic" Double End. 1940.
No. 49 Heald "Bore-Matic" Double End. 1942.
No. 49 Heald "Bore-Matic" Single End. 1942.
No. 47A Heald "Bore-Matic" Single End. 1942.
No. 2112A Excello Single End. 1943.

### BROACHES

No. V-2 American Vertical. 1943.
No. CPC 6-30 LaPointe Vertical. 1941.
Model XA Oilgear Horizontal, 48" stroke.

### DRILLS, HEAVY DUTY

25" Fosdick Economax. 1941.
No. 121 Baker Upright. Late.
21" Candey Otto. Like New.
No. 40 Fox Multiple Spindle. 1944.
No. 3 Bausch Multiple Spindle.
Barnes 2 Spindle Deep Hole. 1943.
No. ½Bx50 P&W Deep Hole Drill. Late.
No. ½Bx50 P&W Deep Hole Reamer. Late
No. ½Bx30 P&W Deep Hole Reamer. Late.
No. ½Bx50 P&W Deep Hole Rifler. Late.

### DRILLS, RADIAL

Bausch Comb. Drill & Tapper. Late.
3' Leland Gifford Tapper. 1941.
20" Pfiffner Drillmaster. 1942.

### DRILLS, SENSITIVE

20" Walker Turner, 6 Spindle. 1942.
No. KH2 Allen, 6 Spindle. 1943.
16" Atlas, 4 Spindle. 1942.
15" Atlas, 4 Spindle. 1942.
14" Delta, 4 Spindle. 1942.
No. 2 Motor-Avey, 3 spindle. 1942.
No. 2 MS Allen, 1 to 3 Spindle. 1942.
No. 2 Hamilton-Muehlmat. 1943.

### GEAR EQUIPMENT

No. 12 Gleason Gear Rougher. 1943.
No. 27 Gleason Gear Tester. 1941.
No. 17 Gleason Gear Tester. 1943.
3" Gleason Bevel Gear Gen. 1942.
No. 6 Gleason Tester. 1942.
No. 7 Gleason Revex Cutter Sharpener. 1942.
No. 12 Gleason Tool Sharpener. 1942.
No. 140 Cleveland Rigidhobber. 1942.
Vinco Spline & Gear Grinder. 1942.
No. 7125A Fellows Gear Shaper. 1943.
No. 715 Fellows Gear Shaper. Late.
No. 712 Fellows Gear Shaper. 1942.
Type S Barber Colman Hobber. 1942.
12" Red Ring Internal Shaver. Late.
No. GCL-3 Red Ring Shaver. 1942.
No. 860B Michigan Finisher. Late.
15" Red Ring Lapper. 1942.
10" Red Ring Gear Speeder. Late.
Red Ring Universal Gear Checker. 1942.

### GRINDERS, CYLINDRICAL

16"x36" Cincinnati Plain. 1942.
14"x36" Norton Type C Universal. 1943.
12"x48" Cincinnati Universal. 1943.
10"x72" Landis Type C Plain. 1942.
10"x24" Landis Type C Universal. 1942.
10"x18" Norton Type C Plain. 1942.
6"x30" Cincinnati Plain. 1943.
6"x24" Norton Plain. 1936.
6"x18" Cincinnati Plain. 1942.
6"x18" Landis Type C Plain. 1941.
6"x18" Norton Type C Plain. 1942.
4"x12" Landis Type H Plain. 1944.
No. 5 Brown & Sharpe Plain. Late.
No. 2 & 3 Cincinnati Centerless. 1942.
16"x72" Norton Crankshaft Grinder.

### GRINDERS, INTERNAL

No. 16A22 Bryant Hydraulic. 1943.
No. 81 Heald "Sizematic". 1942.
No. 74 Heald Extended Bridge. 1941.
No. 75A Heald Two Motor. 1943.
No. 72 A3 & A5 Heald Plain. 1944.
No. 50 Heald Plain. 1941.
No. 5 Bryant Internal. Late.
No. 104 Rivett Internal-External. 1943.

### GRINDERS, SURFACE

14"x36" Pratt & Whitney Vert. 1938.
6"x18" Robot. 1942.
No. 2B Reid. 1944.
No. 2-3 Reid. Late.
No. 25A Heald Rotary. 1942.
No. 22 Heald Rotary. 1943.
A1-8 Arter Rotary. 1942.
6" Taft Pierce Rotary. Late.
72" Rogers Knife Grinder. Late.

### GRINDERS, TOOL & CUTTER

72" Lapointe Broach Grinder. 1941.
72" Thompson Broach Grinder. 1941.
No. 22 Covel Universal. 1942.
No. 91A Covel Universal. 1942.
No. 4T Sellers Carbide. 1942.
Barber Colman Comb. HRS. 1943.
Sundstrand Carbide. 1942.
No. 2 Leblonde. Late.
No. 6-6 Sellers Drill Grinder. 1942.
No. 13 Brown & Sharpe Universal.
No. 44 & 48 Excello Carbide. 1942.
Milwaukee Face Mill. 1942.
No. P5 Bura-Way Carbide. 1942.

### LATHES, ENGINE

24"x168" Sidney. 1942.
18"x54" Lodge & Shipley. 1943.
18"x48" Bradford. 1942.
16"x30" American "Pacemaker". 1944.
14"x78" Reed Prentice. 1942.
14"x54" Reed Prentice. 1942.
14"x30" Bradford. 1942.
14"x70" Lodge & Shipley. 1943.
14"x6' Hendey.
14"x6' Reed Prentice.
12"x36" Sebastian. Late.

### LATHES PRODUCTION

20"x25" Fay Automatic. 1942.
14"x42" Monarch "Magna-Matic". 1941.
12"x18" Lipe "Carbo". Latest.
10"x21" Sundstrand, Model 10. 1942.
9"x20" Lipe High Speed. 1942.
8"x36" Lo-Swing Semi-Auto. 1942.
8"x21" Fay Automatic. 1942.
8"x15" Sundstrand, Model 8. 1942.
Model 1MP & R Lo-Swing. 1942.

### LATHES, TURRET

No. 3A Warner & Swasey. 1943.
No. 9A Jones & Lamson. 1942.
No. 3L Gisholt. 1941.
No. 2FU Foster "Fastermatic". 1943.
No. 1A Warner & Swasey. 1943.
No. 1 Acme Universal. 1941.
No. 8½x24" Acme Universal. 1943.
No. 2, 3, 4 & 5 Warner & Swasey. 1942.
No. 2, 3 & 7 Bardons & Oliver. 1943.
No. 3 & 4 Gisholt. 1943.
No. 4 Midland. Late.
No. 2L Gisholt.
No. 2A Warner & Swasey.

### MILLING MACHINES, PLAIN

No. 3B Brown & Sharpe. 1941.
No. 3 Van Norman. 1942.
No. 2H Milwaukee. Late.
No. 2HL Milwaukee. 1942.
No. 2L Van Norman. 1942.
No. 2B Brown & Sharpe.
No. 3 Cincinnati.
Nichols Hand Mill. 1942.
No. 1M Kent Owens Hand. 1942.

### MILLING MACHINES, PRODUCTION

No. BL-2420 P & W "Keller", 3 spindle. 1942.
No. BL-2416 P & W "Keller", 1 Spindle. 1943.
No. BG-1 "Keller", Single Spindle.
No. 1248 Milwaukee "Simplex". 1942.
No. 4-48 Cincinnati Hydromatic. 1943.
No. 4-36 Cincinnati Hydromatic. 1942.
No. 2-18 Cincinnati, Rise & Fall. 1942.
No. 1-18 Cincinnati Plain. 1942.
No. 12 Brown & Sharpe. 1942.
No. 2-20 Kent Owens. 1942.
No. 1-14 Kent Owens. 1943.
No. 08 Cincinnati, Rise & Fall. 1942.
No. 08 Cincinnati, Plain. 1942.
No. MM-1-5-2 U.S. Multi-Miller. 1943.
No. MM-1-6 U.S. Multi-Miller. 1942.
No. 0, 00 & 2 Sundstrand "Rigidmil". 1943.

### MILLING MACHINES, THREAD

6"x60" Pratt & Whitney. Late.
12"x54" Lees-Bradner. 1943.
8"x16" Hanson Whitney. Late.
4½"x12" Pratt & Whitney. 1942.
4"x9" Hanson Whitney. Late.

### MILLING MACHINES, UNIVERSAL

No. 2 MH Cincinnati. 1942.
No. 2L Cincinnati. 1941.
No. 2H Milwaukee. 1942.
No. 2SU Van Norman. 1942.

### MILLING MACHINES, VERTICAL

No. 3K Milwaukee. 1942.
No. 3H Milwaukee. 1940.
No. 3 Cincinnati. 1942.
No. 2K Milwaukee. 1942.
No. 2 Cincinnati. 1940.
No. 2 Milwaukee.

### MISCELLANEOUS

No. 35 Excello Univ. Thread Grinder. 1943.
6"x½" Bertsch Bending Roll. Late.
6'x14 Ga. Pexto Power Shear. 1941.
No. 405 Williams Turnings Crusher. 1943.
200 Lb. Bradley Helve Hammer. 1941.
No. 7B High Speed Riveting Hammer. 1942.
Jones & Lamson Comparator. Late.
50 KVA Federal Spot Welder. 1942.
No. 616 Cleveland Rigidturner. Late.
No. 26F Norton "Hyprolap". 1942.
No. 1 Savage Roller Type Nibbler. New.
No. 3U Gorton Pantograph. Latest.

### PLANERS & SHAPERS

52"x36"x40' Cincinnati Planer.
36"x36"x16' Ohio Planer.
24" American Crank Shaper.
20" Gould & Eberhardt Shaper.
16" Gould & Eberhardt Shaper.
12" New Haven Vertical Slotter.
6" Pratt & Whitney Vertical Shaper.

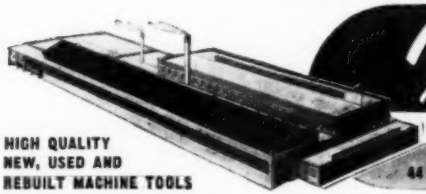
### PRESSES

100 Ton Hannifin Hydraulic. 1942.
50 Ton Denison Hydraulic. Late.
45 Ton Reliance. 1942.
No. 8-6 Zeh & Hahnemann. 1942.

### SAWS

14"x20" Racine "Shear-Cut". 1942.
13"x13" Peerless Universal. 1943.
No. 302 Campbell Abrasive. Late.

**ALL MACHINES MAY BE INSPECTED UNDER POWER IN OUR WAREHOUSE**



**INDIANAPOLIS MACHINERY & SUPPLY CO.**

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### AUTOMATICS
Conomatic 1⅞", 8 spindle
Cleveland, Model AA-08

### BORING MILLS
Cleveland #1, 2½" bar, MD (Horiz.)
Lucas #41, 4½" bar, MD (Horiz.)
Bullard New Era, 24", Side Head, MD
King 34", one rail head, MD
Bullard New Era 36", Side head MD
Niles 36-44 Vert. Turret Side head MD
Bullard Maxi Mill 54", two rail heads, MD
Defiance #6 Horiz. 4½", MD

### LATHES
SIDNEY 24"x168" centers, 16 speed G.H.

### LATHES—ENGINE & PRODUCTION
American 14"x9'—14"x8', 3 SCD, BG, Bowl Head
American 16"x6'—16"x8', 3 SCD, D.B.G.
American 16"x6'—16"x8' GH, MD
American 18"x6'—18"x8'—18"x10' GH, MD
American 18"x8'—18"x10' 3 SCD, DBG, Bowl Hd.
Boye & Emmes 18"x6' SCEL
Boye & Emmes 18"x8' SCEL
Boye & Emmes 20"x10' SCEL
Boye & Emmes 24"x10' ND, GH
Boye & Emmes 28"x16' GCG, MD
Boye & Emmes 40"x30' GH
Hendy 14"x6' Model EBM, Tool Room, MD
Hendy 14"x6' 4 SCD, Yoke head
Hendey 18"x8' 4 SCD, Yoke Head, Tool Room
LeBlond 14"x9'—14"x8' 4 SCD, BG
LeBlond 14"x6' GH, MD, BG
LeBlond 17"x6'—17"x8' GH, MD
LeBlond 17"x8' 3 SCD, Hi Duty, DBG
LeBlond 21"x8'—21"x10' ND, 3 SCD, DBG
Monarch 14"x6' 3 SCD, DBG
Monarch 16"x6'—16"x8' GH, MD
Monarch 18"x10' Model BB16 Speed GH, MD
Monarch 20"x10' Model BB16 Speed, GH, MD
Reed Prentice 16"x8' GH, MD
Sebastian 16"x8' 4 SCD
Lodge & Shipley 16"x6'—16"x8' Selective GH, MD
Lodge & Shipley 16"x6'—18"x10' Selective GH, MD
Lodge & Shipley 18"x54" centers GH, Latest Type
Lodge & Shipley 18"x8'—18"x10' 3 SCD, DBG
Sebastian 20"x8' GH, MD Very Late Type
American 24"x12', 2 speed GH, SCEL
American 24"x12', 8 speed GH, SCEL
American 24"x16', GH, SCEL, MD
American 32"x15', SCEL, MD
American 30"x26' GH, SCEL, MD
Lodge & Shipley 24"x14', SCEL, 3 SCD, DBG
LeBlond 25"x12' HD, QC, SPD, SCEL
LeBlond 25"x16', HD, 3 SCD, SCEL
Niles Timesaver 30"x10' (First Class Cond.)
Lodge & Shipley 36"x26', Patent Head, SCEL

### GEAR CUTTERS
Gleason 3" Bevel Gear Generator, SPD
Gleason 6" Bevel Gear Generator SPD
Gleason 15" Spiral Bevel Gear Generator
Barber Coleman Model S for Precision Gears
Fellows #615 Helical Spur Gears MD
Fellows #6 Cuts internal & external
Pfauter #82 Hobber, 40" Cap.
Gould & Eberhardt 30" S Automatic Gear Cutter
Gould & Eberhardt 18 H Gear Hobber, MD
Brown & Sharpe 28", 36", 40" and 60", SPD

### GRINDERS—ALL TYPES
Landis 4"x12" Type H, Plain Cyl.
Landis 10"x24" Type C Hyd. Univ., Latest
Landis 12"x72" Plain Cyl., MD
Landis 16"x72" Plain Cyl. Self Contained, MD
Landis 20"x229" Plain Cyl. Self Contained, MD
Landis Chaser Grinder, Model Y MD
Norton 10"x24" Type BA Plain Cyl. MD
Cincinnati 12"x48" Plain Cyl., MD
Brown & Sharpe #2 Univ., Belt Drive
Heald 72A3 Internal, Complete, MD
Ex-Cell-O 31L Precision Thread MD
Rivett 104-2, Internal MD
Cincinnati No. 3 Centerless
Gardner #120 A SI Opposed Wheel Grinder Latest type
Gardner #124-53 Horiz. Disc Grinder MD
Pratt & Whitney 10" Spiral Gear, 2 Wheel type
Thompson 6"x18", 6"x24" Type F Hyd. Surface
Norton 6"x18" Surface Grinder, MD
Arter Model A 3 12 Surface Grinder, MD
Heald 25A Rotary Surface Hyd. 16" Chuck, 1943
Gallmeyer & Livingston, 14"x18"x72" Model A Hyd.
Bridgeport #95—60" Face Grinder

### LATHES—TURRET
Gisholt #3 Univ. Ram Type, New 1943
Gisholt, #3L, Saddle Type, Hardened Way, MD
Warner & Swasey #2A Hollow Hex
Warner & Swasey, #3 Univ. Late type
Warner & Swasey #3A Univ. Timken Bearing, MD
Warner & Swasey #1A
Warner & Swasey #2
Jones & Lamson 3½"x32" Flat Turret, MD
Gisholt, #2L, Univ. New 1943

### SHAPERS & SLOTTERS
Smith Mills 15" single pulley drive GB
Gould & Eberhardt 16", 28", 24" V ram, Cone drive BG
Gould & Eberhardt 18" Univ. MD
Cincinnati 18", 24" Back Geared, Cone Drive

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**Cincinnati Machinery Co., Inc.**
**219 East Second Street**
**Cincinnati 2, Ohio**



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16"x54" LE BLOND Toolroom Lathe, 1943
20"x10' AMERICAN High Duty 12 Speed Timken Head, taper attachment, M.D.
24"x16' LODGE & SHIPLEY, 12 Speed Geared Head Engine Lathe, taper attachment
24"—36"—42" and 54" BULLARD V.T.L.
42"x96" AMERICAN 16 Speed G. H. Engine Lathe
48"x28' DRIGGS (NEW HAVEN) G. H. Lathe
No. 3 BARDONS & OLIVER Turret Lathe
No. 4 GISHOLT Turret Lathe, bar feed
No. 1224 KEARNEY & TRECKER Simplex
42"x42"x12' INGERSOLL Adjustable Rail Planer Type Mill, 4 heads, 25 HP motor
24" HENDEY Shaper, factory motor drive
32" OHIO Heavy Duty Shaper, 1942
Type BGI-482 KELLER Automatic Toolroom Duplicating Machine, 3 dimensional, 1944
6' CINCINNATI GILBERT Radial, 17" column, motor on arm
No. 5 NEWARK Universal Gear Hobber, 72" cap.
84" CONSOLIDATED COLBURN Vert. Boring Mill Rapid Traverse 2 heads A.C.—M.D.
No. 32 LUCAS Hor. Boring Mill, A.C.—M.D.
No. 7 BARRETT Cylinder Borer 8" Bar

O'CONNELL MACHINERY CO.
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Colburn (Consolidated) 48" Heavy Duty Vertical Boring & Turning Mill; Power Rapid Traverse; Dis. Under Rail 40"; Vertical Travel of Rams, 30".

Cincinnati Nos. 2-36 & 5-42 Duplex Vertical Hydro Broaches

EXCELLO NO. 112-C PRECISION BORING MACHINES, DOUBLE SPINDLE, LATE

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Gleason No. 13 Universal Gear Testers For Spur, Helical & Bevel Gears, M.D.

Hammond DE Disc Grinders, 18" & 26", Late Type, B.B., Auto Lubrication

Abrasive No. 5 Surface Grinder, 14"x14"x 48" Capacity, Hyd. Table Feed

Heald No. 25-A Surface Grinder, 26" Diameter Magnetic Chuck, Motor Drive

EXCELLO NO. 35-L THREAD GRINDER, LATE TYPE, 12"x48" CAPACITY VAPOR HOOD, AUTO. DRESSER, ETC.

Brown & Sharpe No. 13 Universal & Tool Grinder, M.D., Late Type

American 12"x7' 12-Speed Geared Head Lathe, T.A., Motor in Base

Warner & Swasey No. 1-A Turret Lathe, Bar & Chucking, Excellent Condition

Kent-Owens No. 2 Hand Mill; very late type, Motor Drive

CINCINNATI NO. 4 UNIVERSAL MILLING MACHINE, HIGH POWER RECT. OVERARM, TIMKEN BEARING, POWER RAPID TRAVERSE, EXCELLENT CONDITION

American 24" Heavy Duty Shaper Power Rapid Traverse, M.D.

HOWARTH Machinery Co.
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SIMMONS MACHINE TOOL CORPORATION • MAIN OFFICE AND PLANT, 1759 N. BROADWAY, ALBANY, N. Y.

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The following machine tools have all been completely rebuilt in our plant. They are ready for your immediate inspection and delivery. They have been dismantled to the main castings and thoroughly cleaned . . . all worn or broken parts renewed, sliding surfaces ground or scraped and worn shafts or bearings replaced. They are ready for your inspection NOW!

24" Bullard Vertical Turret Lathe Spiral Drive, 4-Jaw Chuck Table.
62" Niles Vertical Boring Mill, 2-Heads, 12 Mechanical Table Speeds.
2½" Spindle Cleveland Horizontal Boring Mill, Table 20"x42".
No. 31 Lucas, 3" Spindle Horizontal Boring Mill, Table 24"x48".
5" Spindle Niles, "TIMESAVER" Horizontal Boring Mill, Table 60"x96" with 2⅝" high speed spindle, Forced Feed Lubrication and Threading.
7' Arm American Plain Radial Drill, Power Rapid Traverse.
No. 70 Heald Internal Grinder, 3-Motors.
18-H Gould & Eberhardt Gear Hobber.
36-H Gould & Eberhardt Gear Hobber, Automatic In-Feed.
10"x20" Monarch "Sensitive Precision" Lathe, Spindle Speeds RPM—100 to 1800.
18"x27" Centers American 12-Speed, G.H.
20"x72" Centers Lodge-Shipley, G.H., Pan and Taper Attachment.
24"x84" Centers American 12-Speed G.H., Taper Attachment.
42"x26' Centers American "HIGH DUTY" 16-Speed, G.H., 2-Carriages.
No. 2A Brown & Sharpe Universal Milling Machine, Table 10½"x50".
No. 3 Kempsmith "MAXIMILLER" Plain, Table 14"x58".
48"x48"x12' Detrick & Harvey Extra Heavy Planer, 3-Heads.
60"x60"x18' Niles Heavy Planer, 3-Heads, 230 V. D.C.
32" Cincinnati Heavy Shaper, Power Down Feed to Head.
6" Pratt-Whitney Vertical Shaper, 20" dia. Rotary Table.
No. 1A Warner-Swasey 2½" Chucking.
26" Libby Turret Lathe, 7½" Hole, 20" Chuck Threading.

***NEW YORK CITY OFFICE: 50 EAST 42nd STREET***

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### AUTOMATICS

9/16", 1", 1¼", 1⅝", 2", 2¼", 2⅝" Acme Gridleys, late
#9G B & S, late type
1½" & 1⅝" 8 Spdl. Cone, late
2½ & 2⅝" Cone 6 Spdl., late
12" and 16" 8 Spdl. Bullard Multaumatics, late

### PRESSES

2800 ton Bliss Hydr., 3 col. type, 12" str., 50½" sht. ht., dia. bed 115"
60 ton Dbl. Crank, 5" stroke, 48x24 bed, late model Waterbury Farrel
90 ton Dbl. Crank, 8" stroke, 48x18 bed, late model Bliss
35 ton 4, S, 6" stroke, latest type, w/all accessories, Bliss $850.00 ea.
70-85 ton 4" stroke 21 x 27 bed, 110 strokes per min., Bliss, latest type
90-125 ton 4½" or 5" stroke, 60, 80, 110 (optional) strokes per min., late type
Inclinable, New, 20 to 70 ton, immediate delivery
375 ton Elmes, 12" stroke, 84x54 bed, late type
350 ton Elmes, 20" stroke, 36x45 bed, late type
250 & 750 Baldwin, 144x48 bed, 40" stroke
#305 Bliss, 12" stroke, late

### TURRET LATHES

#3 & #5 Warner & Swasey, late type w/Tools
#4FU Fastermatic, 4" cap., late type
#3MR Libby Sliding Bed Gap, 8¼" cap., late type 72" swing, 30 H.P. Mtr.

MONA MEMBER

**PAULS MACHINERY COMPANY**
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Phone: TYLER 7-6300

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LIBERTY 48"x48"x16' DOUBLE HOUSING PLANER. MFG. 1942. With Four Heads, Serial No. 531-6. PRICE ..... $16,000.00

SIDNEY 24" SWING x 15' CENTERS LATHE. MFG. IN 1942. With Equipment and Power Fed Boring Attachment. Serial No. 7055. PRICE ..... $10,000.00

GEMCO 20" SHAPER. MFG. APPROX. 1946, with 12" Vise, Serial #5649. PRICE ..... $3,250.00

DEFIANCE #5 HORIZONTAL TABLE TYPE BORING MILL. MFG. 1938. 3¾" Bar, Serial #867-38. PRICE ..... $9,000.00

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#4 GISHOLT RAM TYPE TURRET LATHE WITH PRESELECTOR HEAD. MFG. 1942. With Equipment. Serial No. 720-17. PRICE ..... $3,000.00

#2 CINCINNATI TOOL & CUTTER GRINDER. MFG. IN 1942. Excellent Condition. PRICE ..... $1,500.00

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#34-36 CINCINNATI HYDROMATIC HIGH SPEED MILLING MACHINE. LATE TYPE. PRICE ..... $3,250.00

FELLOWS HORIZONTAL TYPE Z GEAR SHAPER. Serial No. 22646. LATE TYPE. PRICE ..... $2,250.00

MONA MEMBER

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Nos. 1 & 2 W & S Turret Lathes, 1943.
No. 13 B & S Universal Grinder, M.D.
No. 4 Cinn. High Power Vert. Mill.
60" LaPointe Univ. Broach Sharpener.
Norton 6"x30" Type C Plain Hyd. Grinder.

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Bar. Mill. Hor. 3" G & L, MD. 4½" N-B-P—MD.
Boring Mills. 24"-30"-42"-52"
Drills, Radial 3'-4'-5'-6' Cin.-Bick.
Lathe, Turret S-A W and S, B.P.D.
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Millers, Vertical No. 3 B and S and No. 4 Cin.
Shaper, 19"-20"-24"-36".
Shaper, 36" Morton Draw Cut.
Squaring Shear, Niagara 11'x10 gauge

**West Penn Machinery Company**
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# HEADLINERS

## LATHES

12"x30" MONARCH Model C Tool Room
14"x8' AMERICAN 12-speed Grd. Hd., AC MD, Taper
18"x12' LODGE & SHIPLEY Selec. Grd. Hd., AC MD
20"x8' LODGE & SHIPLEY Selec. Grd. Hd., AC MIB, taper
22"x10' ROCKFORD 3 SCD DBG bowl hd.
24"x12' BOYE & EMMES, AC Turner Uni-Drive
24"x12' AMERICAN Grd. Hd., AC MD, taper
24"x14' LODGE & SHIPLEY, Turner Drive, Taper
30"x16' LODGE & SHIPLEY, Lima Drive, taper

## MILLERS

#1—18" CINCINNATI Auto. Plain, backlash elim., 1943
Type "P" OHIO Production Miller, new 1943
#2 CINCINNATI H.P. Rect. O/A Plain, AC MIB, PRT, Timken
#2B MILWAUKEE Plain, AC MD, DOA
#3B MILWAUKEE DOA Plain, AC MIB, PRT
#4 CINCINNATI H.P. Univ., Lima Drive, div. hd., slot attach
#4 CINCINNATI H.P. Rect. O/A Plain, PRT, AC MD
#5 CINCINNATI H.P. Rect. O/A Plain, PRT, AC MD

## SHAPERS

14", 24", 28", 32" GOULD & EBERHARDT High Duty
28" AMERICAN H.D., AC MD
32" CINCINNATI Hvy Duty, AC MD

## RADIAL DRILLS

4' MORRIS, Enclosed Head, AC MD
6' CINCINNATI-BICKFORD mtr. on arm
7' DRESES, 17" col., AC MD thru gearbox

## GRINDERS

#3 ABRASIVE Surface, AC MD
#25A HEALD Rotary Surf., AC MD
10"x24" LANDIS Type C Univ. Hydr., new 1943

## BORING MILLS

#3A UNIVERSAL Horz. 3" bar, SPD
#43 LUCAS Horiz., AC MD, 4½" bar, 20' betw. faceplate & outer support
38" KING Vert. Boring Mill, AC MD

## GEAR MACHINERY

#12H GOULD & EBERHARDT Hobber, AC MD
#18H GOULD & EBERHARDT Hobber, AC MD
#34 BROWN & SHARPE Hobber, AC MD

## TURRET LATHES

#4-W CINCINNATI ACME Univ., AC MD, thread chasing
#4 WARNER & SWASEY Univ. Grd. Hd., AC Mtr. in leg
#5 WARNER & SWASEY Univ. Grd. Hd., AC MD
#601 OSTER "Rapiduction," AC MD, bar feed

## MISCELLANEOUS

#4 WATERBURY-FARRELL Thread Roller, AC MD
2½" LANDIS Dbl Hd., Bolt Threader, AC MD
10" PRATT & WHITNEY Vert. Shaper
10' x 16 ga. CHICAGO Steel Leaf Brake, AC MD

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AUTOMATICS—Natl. Acme 1⅝", four spindle. Bargain
GRINDER—(Rotary) Blanchard 25" mag. chuck belt $500.00
HYDROHONER—Micromatic Model #4H (1943)
LATHE—So. Bend Tool Room, 14"x6' Taper, late
Bamford-Chase Tool Room, 14"x6' Taper, late.
Bridgeford, Engine, g. head, 32"x21' centers.
MILLER—Plain K. & T. #4K, Late.
PRESSES—(2) Bliss #305, 100 ton, late.
(2) Bliss #6—125 ton, late.
(1) Lake Erie—750 ton, hydraulic, Bed 72"x 146" single or dble action, Late.
SHEARS—Niagara 10' x 10 G, gap
Barth (New) 54" x 14 G.
WELDERS—(New) Sterling 10, 20, 30 KVA, bargain.

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ALLEN #2 Motor Spindle—2 sp.
CANEDY-OTTO 21" Box Col. Upright
LELAND-GIFFORD 1LMS Sing. Sp.
LELAND GIFFORD 1 LMS—6 spindle
LELAND GIFFORD 2MS 2-spindle—power feed
LELAND GIFFORD 2LMS—Single Sp.—Pw. Fd.

### GRINDERS

ARTER #3—12 Surface
BLANCHARD #1—20" Surface
B&S #1 Universal
B&S #2 Auto. Feed Surface
CINCINNATI #2 Centerless
GRENBY 10-12 Internal
LANDIS 10"x24" Universal
LANDIS #4H 4"x12" Cyl.
NORTON 4"x18" Hyd. Plain—New '47
NORTON 6"x18" Type C Cyl.
NORTON 12"x36" Mult. Purpose
NORTON #2 Cutter and Tool
SELLERS Model #6T Wet Tool—M.D.

### MISCELLANEOUS

BLISS #4 Stiles Type Press—45 ton
BOYER SCHULTZ #2 Profile Grinder (New—in orig. crate)
FOSTER Superfinisher
L&J #5 OBI Press—M.S. (never used)
PERKINS #450B—35 ton OBI Press—NEW
PRATT & WHITNEY #12B—2 Spindle Profiler
ROCHESTER 3" Bar Hor. Boring Mill

### LATHES

LEBLOND 13" Rapid Production
LODGE & SHIPLEY 14"x30" Selective Head
MONARCH Model CAA 14"x54" centers
SEBASTIAN 16"x8' Geared Head (NEW)

### TURRET LATHES

B&S #2 Wire Feed
GISHOLT #5 Univ.—Air Chuck
GISHOLT #3R Saddle Type—bar and chucking
JONES & LAMSON #5 Ram Type—Pres. Hd.—Chucking
W&S #3 Univ.—Air Chuck
W&S #2A Saddle Type—Pres. Hd.—New '44
W&S #3A Saddle Type—Cross Sl. Turret

### MILLING MACHINES

B&S #000 Plain
B&S #2 Light Type Univ.
CINCINNATI #2 Rise & Fall Production—New Dec. '48
CINCINNATI #2 Dial Type Hi-Speed—Vert.
CINCINNATI #2-24 Rise & Fall Production
K&T #2HL Plain
K&T #2K Plain
K&T #3H Plain
K&T #2K Vert.
K&T #3H Vert.
"Nichols"—Hand (2)
LEES-BRADNER #40 Thread
VAN NORMAN #2S Plain
VAN NORMAN #3S Plain
VAN NORMAN #22L Universal

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## HEAVY EQUIPMENT FOR SALE

AJAX 1½", 3½" Upsetter and Forging MD
BIRDSBORO 325 Ton Vert. Press Hydraulic New 1942
BULLARD 16 6-spindle Multaumatic New 1943
BRIDGEFORD 36x24' Centers Motor Drive
CINCINNATI #3, 4 Plain Miller Motor Drive
CLEARING 50 Ton Hyd. Press New 1940
CRANES from 5 to 30 ton cap. 230 volts DC
DILL 20-24" Vertical Slotter Motor Drive
LAKE ERIE 500 Ton Vert. Press Hyd. New 1944
NILES 600 Ton Horiz. wheel press Motor Drive
NILES 100" Vert. Boring Mill 2 swivel heads, MD
NILES 5" Bar Horiz. Boring Mill Floor Type MD
NIAGARA 1000, 1200 KVA Transformers
PUTNAM 42x25' Centers Engine Lathe MD
QUICKWORK ¾", 1" cap. rotary shear MD

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## FOR SALE
## MODERN TOOLS

1—Farrell 2 wheel Roller Grinder, M.D.
1—Marvel #4B Hacksaw, M.D.
1—3 ft. Morris Mor-Speed Radial Drill, M.D.
1—Cincinnati #2 Milling Machine, M.D.
1—14"x6" Hendey Lathe, M.D.

**IRVING BARCAN CO.**
**249 Orient Ave., Jersey City 5, N. J.**
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2—Lodge & Shipley Duomatic lathes
2—Potter & Johnston #5 DE Chucking machines
1—D. E. Whiton #16 gear cutter
1—Monarch Lathe, 22 x 48"
1—3 spindle Gould & Eberhardt spur gear and bevel rougher
1—Heald double spindle Borematic

SIER-BATH GEAR & PUMP CO., INC.
9252 Hudson Boulevard, North Bergen, N. J.

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Fellows 615A Gear Shaper Lathe Model. $3600
Barber Colman #3 & #12 Hobbers, Each $500
B&S #2 Auto. Screw Machine, $400
Wickman #2 Swiss Automatic Late Model. $1000
Midland #5 Turret Lathe 1942. $2500
Noblewest Pneumatic Marking Mach. 1947. $600
Landis 4x12 Cyl. Grinder. Late Model. $1600
Bryant 16 C 16 Int. Grinder. Late Model. $1350

DAYTON GEAR & TOOL COMPANY
3929 W. 3rd Dayton 7, Ohio

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Late Type #1L Gisholt Saddle Type Turret Lathe with cross sliding turret. May be inspected under power.

Price ..... $4,500.00

**FAIRFIELD EQUIPMENT CO.**
**100 Sanford Street, Fairfield, Conn.**

# LATEST TYPE
*NEARLY NEW*
# MACHINE TOOLS

**BORING MILLS—Horizontal**
CINCINNATI GILBERT 3¼" bar, floor type, latest
DETRICK & HARVEY 4" bar, Floor Type, M.D.
GIDDINGS & LEWIS #23T, 2¾" Bar—latest
GIDDINGS & LEWIS #45, 5" Bar, Table Type, latest
LUCAS #41, 3" bar, Table Type, Latest Type
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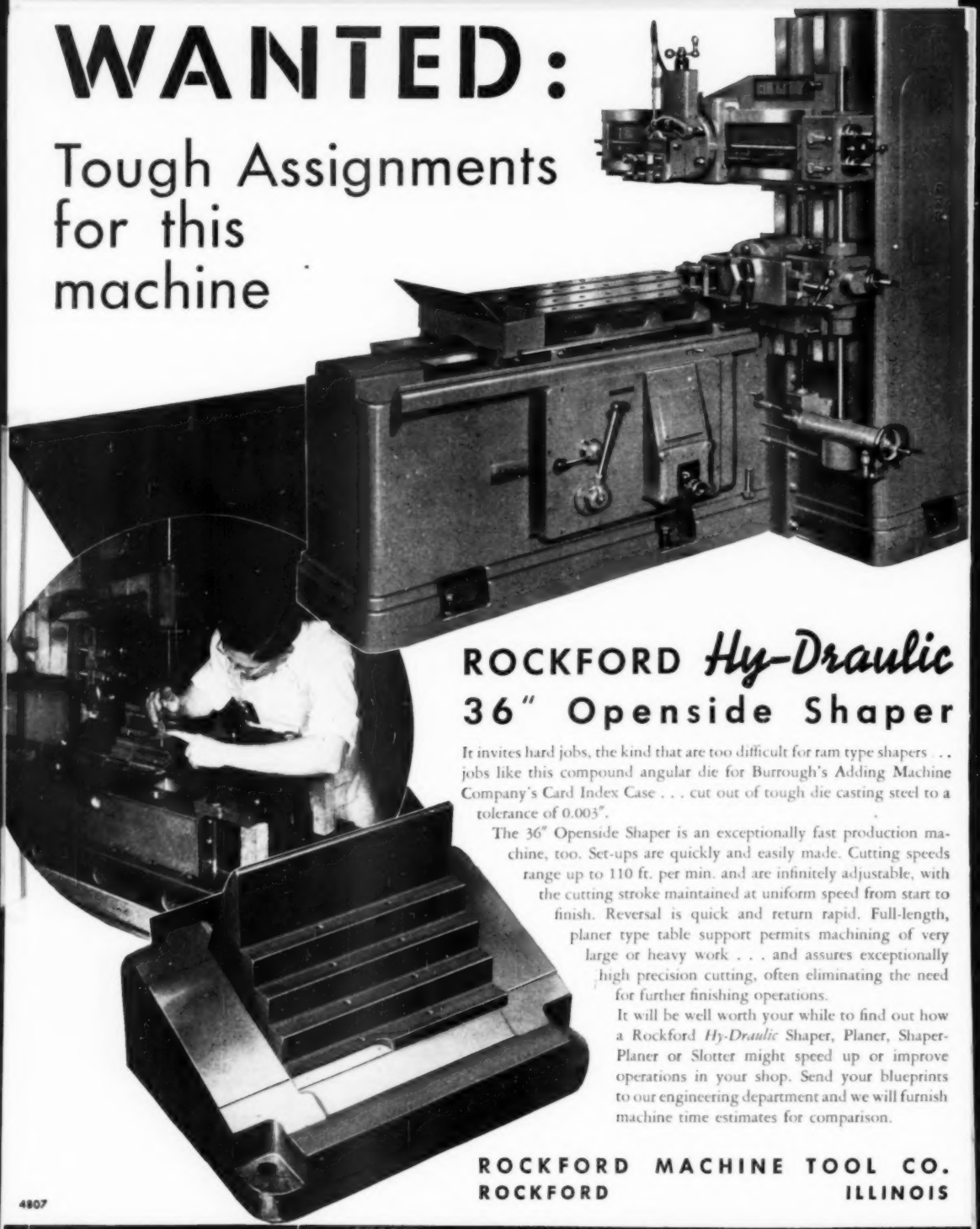

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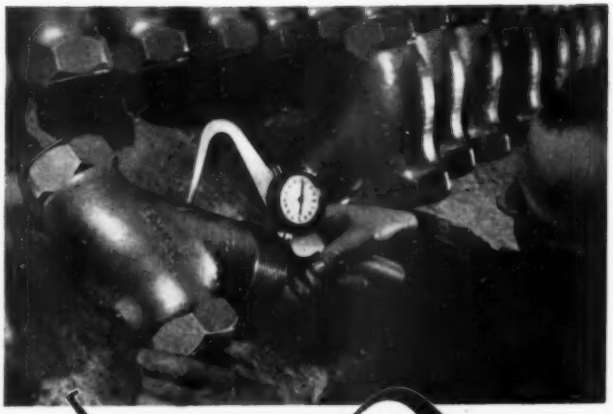

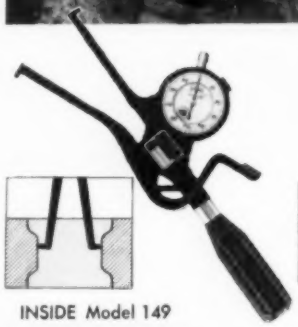

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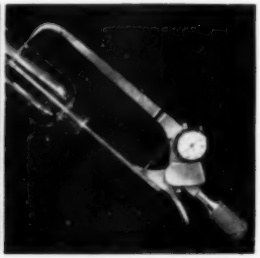

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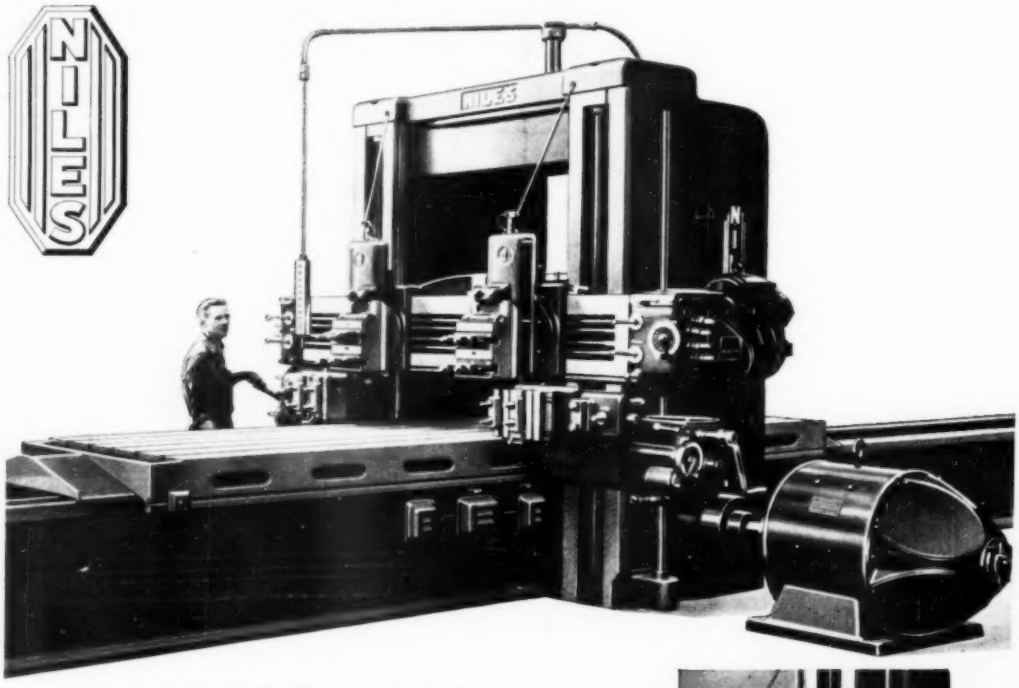



## A MODERN PLANER

# *will save you shop time*

Today's planers have definitely outmoded yesterday's models—rugged and reliable though they were.

The modern heavy-duty planer will have some or all of these advantages, as compared to yesterday's models.

**Variable-voltage Drive**—for steady power stroke with rapid return.

**Duplex Control**—for complete control of operation from either side of the table.

**Electric Feed and Traverse**—independent motor mounted on crossrail powers feed and traverse for all heads.

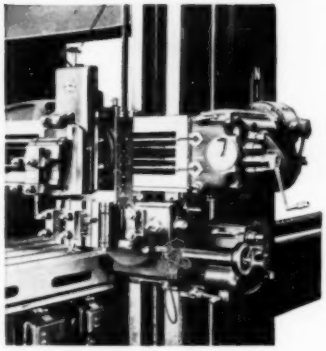
**Four-position Control Lever**—for simple control of up, down, left and right movements of each rail head.

**Automatic Lubrication**—for continuous, positive and proper lubrication of all major moving parts.

Niles "Time Saver" Planers bring you all these advantages. In addition, Niles has two important and exclusive advantages which mean additional savings on the monthly time sheets.

1. **POSITIVE RIGIDITY**—Extra ruggedness is built into the bed, table, crossrail and pedestals—allowing heavier cuts with greater accuracy.

2. **OFFSET SIDE-HEADS**—Side-head tools can be brought close to crossrail tools and without overhang on the crossrail tools slides. Both crossrail and side-head tools are in the same vertical plane.



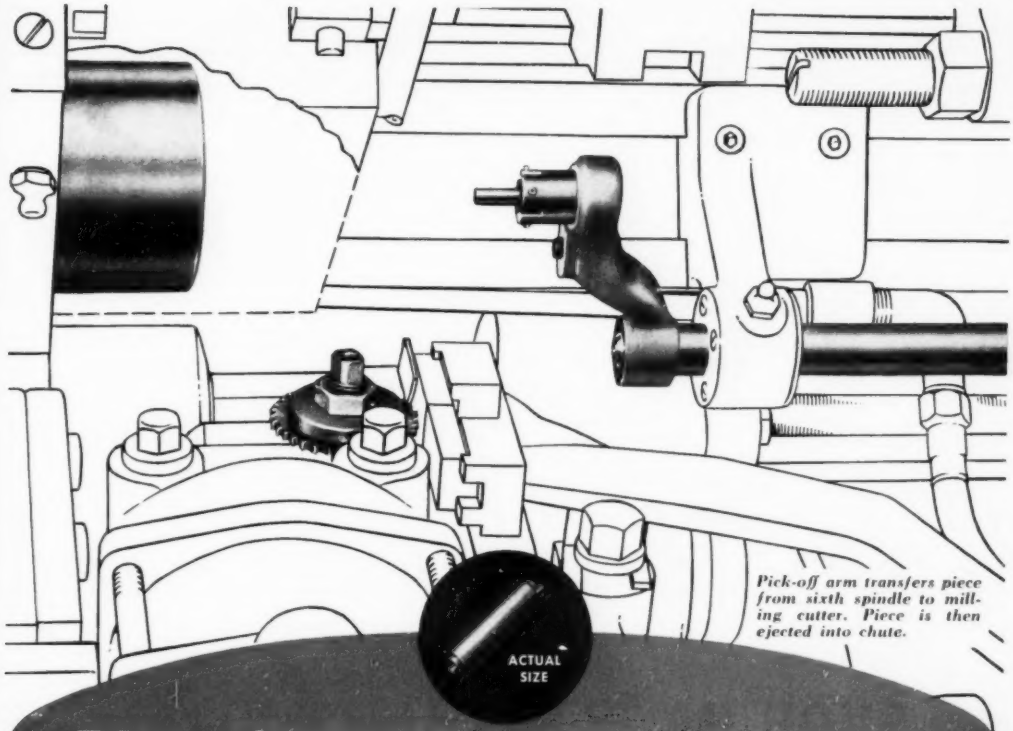
The primary purpose of the offset side-head design is shown above. The side-head and crossrail tools can be brought practically together. Both are in the same vertical plane, saving table travel.

Niles "Time Saver" Planers are available in sizes from 60" to 96". Larger sizes of Niles Planers are available on special request. For more complete details, a bulletin "Time Saver' Planers" is available upon your request. Write LIMA-HAMILTON CORPORATION, HAMILTON, OHIO.

LIMA HAMILTON CORPORATION

**DIVISIONS:** *Hamilton, Ohio*—Niles Tool Works Co.; Hooven Owens, Rentschler Co. *Lima, Ohio*—Lima Locomotive Works Division, Lima Shovel and Crane Division.

**PRINCIPAL PRODUCTS:** Niles heavy machine tools; Hamilton diesel and steam engines; Hamilton heavy metal stamping presses; Hamilton-Kruse automatic can-making machinery; Locomotives; Cranes and shovels; Special heavy machinery; Heavy iron castings; Weldments.



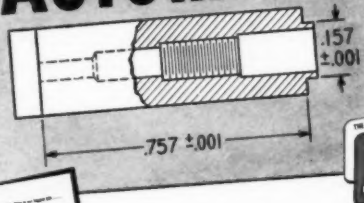
*Pick-off arm transfers piece from sixth spindle to milling cutter. Piece is then ejected into chute.*

ACTUAL SIZE

# 770 COMPLETE PIECES AN HOUR

**Formed, drilled, tapped and milled on a Model 60**

## New Britain Automatic




Pick-off and transfer to milling attachment in sixth position makes it possible to drop off this complete piece in one operation, thereby holding down the cost of a highly competitive assembly. Because of the quantity involved, the close tolerances and the size of the piece, a second operation is out of the question.

Special machine performance on a general purpose machine with rigidity and accessibility means double protection of your machine tool investment.

Would you like to see other types of work done on this and other New Britains? Send for *"It Can Be Done"* . . . a fact packed portfolio of actual cost histories and money-making production methods.

**NEW BRITAIN**

*Automatics*

**THE NEW BRITAIN MACHINE COMPANY**
**NEW BRITAIN-GRIDLEY MACHINE DIVISION**
**NEW BRITAIN, CONNECTICUT**

449HD1

# New TIMKEN® "Double-Zero" bearing has run-out reduced by half!

## *Production being increased to meet growing demand*

ONE industry after another is setting new standards of accuracy by equipping precision machinery with the new Timken® "Double-Zero" bearings. Maximum run-out tolerance—standard of bearing accuracy—is only 75 millionths of an inch in the "Double-Zero" bearing—half that of the Timken "Zero" bearing which had long been the most accurate Timken bearing on the market.

This amazingly low run-out already is proving invaluable in bringing increased precision to grinding machine spindles, small precision rolling mills, lathe spindles, dividing heads, and gear cutting machines. And production of the "Double-Zero" is being increased to meet the growing demand.

If you make a product that can benefit from greater bearing precision, you'll want to learn more about the new Timken "Double-Zero" bearing. It is produced in the sizes and types indicated in the chart below. For further information write The Timken Roller Bearing Company, Canton 6, O. Cable address: "TIMROSCO".

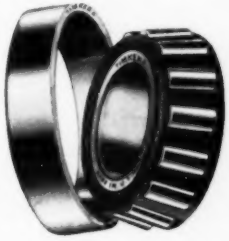
*This symbol on a product means its bearings are the best.*

| A PRECISION TIMKEN BEARING FOR EVERY REQUIREMENT | | | |
|---|---|---|---|
| **CLASS** | **"00" (DOUBLE-ZERO)** | **"0" (ZERO)** | **"3" (THREE)** |
| **RUN-OUT** | .000075" | .000150" | .000300" |
| **TYPES AVAILABLE** | Standard Single Row | Standard Single Row | All types |
| **SIZE RANGE** | Up to 10" O.D. | Up to 12" O.D. | Up to 12" O.D. |

# TIMKEN

TRADE-MARK REG. U. S. PAT. OFF.

## TAPERED ROLLER BEARINGS



NOT JUST A BALL ○ NOT JUST A ROLLER ▭ THE TIMKEN TAPERED ROLLER ▱ BEARING TAKES RADIAL ◫ AND THRUST ◫ LOADS OR ANY COMBINATION ◫